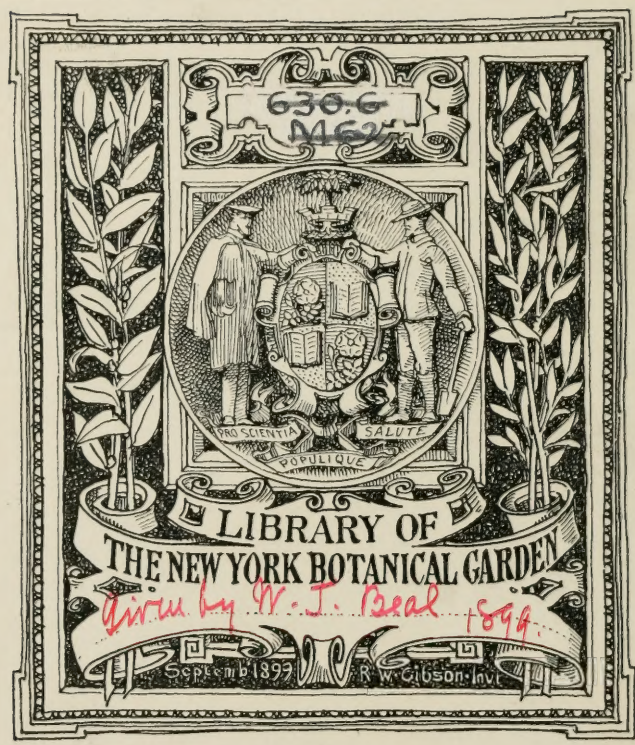


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TENTH ANNUAL REPORT
OF THE
SECRETARY
OF THE
STATE HORTICULTURAL SOCIETY
OF
MICHIGAN.

1880.



BY AUTHORITY.



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W. S. GEORGE & CO., STATE PRINTERS AND BINDERS.
1881.

REPORT OF THE SECRETARY
OF THE
MICHIGAN STATE HORTICULTURAL SOCIETY.

GRAND RAPIDS, Michigan, December 31, 1880.

TO DAVID H. JEROME, *Governor of the State of Michigan*:

I have the honor to submit herewith, in compliance with legal requisition, the accompanying Report of 1880, with supplementary papers.

Respectfully yours,

CHAS. W. GARFIELD,

Secretary of the Michigan State Horticultural Society.

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BOTANICAL
GARDEN

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STATE BOARD OF AGRICULTURE.

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VICE PRESIDENT—HON. J. WEBSTER CHILDS, of Ypsilanti.

HON. GEORGE W. PHILLIPS, of Romeo.

HON. FRANKLIN WELLS, of Constantine.

HON. T. D. DEWEY, of Owosso.

HON. HENRY G. REYNOLDS, of Old Mission.

DAVID H. JEROME, GOVERNOR OF THE STATE,
THEOPHILUS C. ABBOT, PRESIDENT OF THE COLLEGE, } *Ex Officio.*

SECRETARY—ROBERT G. BAIRD.

TREASURER—EPHRAIM LONGYEAR, of Lansing.

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PRESIDENT—G. W. PHILLIPS, Romeo.

SECRETARY—J. C. STERLING, Monroe.

TREASURER—A. J. DEAN, Adrian.

EXECUTIVE COMMITTEE.

Terms expire December 31, 1881.

ABEL ANGEL, Bradley, Allegan Co.
D. W. HOWARD, Pentwater, Oceana Co.
H. O. HANFORD, Plymouth, Wayne Co.
F. M. MANNING, Albion, Calhoun Co.
A. F. WOOD, Mason, Ingham Co.
F. V. SMITH, Coldwater, Branch Co.
C. A. HARRISON, Paw Paw, Van Buren
County.
J. Q. A. BURRINGTON, Vassar, Tuscola
County.
JOHN McKAY, Cheboygan County.
JOHN GILBERT, Ypsilanti, Washtenaw
County.

Terms expire December 31, 1882.

JOS. M. STERLING, Monroe, Monroe Co.
I. H. BUTTERFIELD, St. Clair Co.
E. W. RISING, Davison Station, Genesee
County.
WM. BALL, Hamburg, Livingston Co.
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A. O. HYDE, Marshall, Calhoun Co.
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PHILO PARSONS, Detroit, Wayne Co.

OFFICERS OF THE STATE HORTICULTURAL SOCIETY FOR 1881.

PRESIDENT—T. T. LYON, South Haven.

SECRETARY—CHAS. W. GARFIELD, Grand Rapids.

TREASURER—S. M. PEARSALL, Grand Rapids.

LIBRARIAN—F. W. KING, Lansing.

EXECUTIVE COMMITTEE.

W. K. GIBSON, Jackson, 3 years.

E. F. GUILD, Saginaw, 3 years.

S. B. MANN, Adrian, 1 year.

C. R. CORYELL, Jonesville, 1 year.

JAS. SATTERLEE, Greenville, 2 years.

N. CHILSON, Battle Creek, 2 years.

STANDING COMMITTEES.

ON FRUIT CATALOGUE—T. T. LYON, South Haven, Chairman; GEORGE PARMELEE, Old Mission, for Northern Lake Shore; W. A. BROWN, Stevensville, for Southern Lake Shore; H. DALE ADAMS, Galesburg, for Central Michigan; I. E. ILGENFRITZ, Monroe, for Eastern Michigan; B. W. STEERE, Adrian, for Southern Michigan.

ON NEW FRUIT—T. T. LYON, President; G. H. LAFLEUR, Allegan; GEO. C. MCCLATCHIE, Ludington; C. ENGLE, Paw Paw; DR. A. CONKLIN, Manchester.

ON FINANCE—N. CHILSON, E. F. GUILD, S. B. MANN.

ON ENTOMOLOGY—ALBERT J. COOK, Lansing.

ON LANDSCAPE GARDENING—R. HAIGH, JR., Chairman.

ON VEGETABLE GARDEN—PROF. W. W. TRACY, Chairman.

VICE PRESIDENTS.

A. O. WINCHESTER, Berrien Co.
B. G. BUELL, Cass Co.
CHAS. W. SHELDON, St. Joseph Co.
J. D. W. FISK, Branch Co.
C. R. CORYELL, Hillsdale Co.
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CONSTITUTION

OF THE

MICHIGAN STATE HORTICULTURAL SOCIETY.

ARTICLE I.—NAME, TERRITORY, AND OBJECTS.

The name of the society shall be the Michigan State Horticultural Society; and its territory shall be the State of Michigan. Its objects shall be the development of an adequate appreciation of the peculiar adaptation of the soils and climate of the State to the pursuit of horticulture in all its branches; and the collection and dissemination of information bearing upon the theory and practice of the same, as well as upon the arts and sciences directly or indirectly associated therewith, or calculated to elevate or improve the practice thereof.

ARTICLE II.—OFFICERS AND MODE OF ELECTION.

The officers of the society shall be a President, a Vice President in and for each county of the State, as far as shall be found necessary and practicable; a Secretary and a Treasurer, together with an Executive Board of six members, aside from the President, Secretary, and Treasurer, who shall be *ex officio* members of said board. The officers shall be elected by ballot.

ARTICLE III.—A QUORUM.

Four members of the Executive Board shall constitute a quorum for the transaction of business at any meeting of said board: *Provided*, That each of the members thereof shall have been notified, in the usual manner, of the time, place and object of such meeting.

ARTICLE IV.—ANNUAL MEETING AND ELECTION OF OFFICERS.

The annual meeting of the society, for the election of the officers specified in Article II., shall occur on the first Wednesday of December in each year, and the officers then elected shall enter upon the discharge of their duties as such, on the first day of January next ensuing; but in case of a failure to elect at that time, such election may be held at a subsequent time, at an adjourned meeting, or at a meeting of the society called for that purpose, in the usual manner.

ARTICLE V.—TERMS OF OFFICE.

The officers specified in Article II. shall hold their offices till the thirty-first day of December of the year for which they were elected, and thereafter until their successors shall have been elected, and shall have signified to the Secretary their acceptance: *Provided*, That the terms of office of the six members of the Executive Board shall be so arranged that but two regular vacancies shall occur in each year.

ARTICLE VI.—ANNUAL AND LIFE MEMBERS.

Any person may become a member of the society for one year by paying to the Treasurer the sum of one dollar; but all annual memberships shall expire on the thirty-first day of December of the year for which they were taken, except as may be provided by the by-laws. Any person may become a life member by the payment at any one time of the sum of ten dollars into the treasury of the society.

ARTICLE VII.—AMOUNT OR LIMIT OF PROPERTY.

The society may hold real and personal estate to an amount not exceeding twenty thousand dollars.

ARTICLE VIII.—BY-LAWS.

By-laws for the government of the society shall be framed, and when needful, amended by the Executive Board; but changes thereof may be at any time proposed by the society in general meeting.

ARTICLE IX.—AMENDMENTS.

This constitution may be amended at any regular meeting of the society by a vote, by ballot, of two-thirds of all the members present, and voting: *Provided*, That notice of such proposed amendment, specifying its purport, shall have been given at the last previous regular meeting.

BY-LAWS OF THE MICHIGAN STATE HORTICULTURAL SOCIETY.

I.—THE PRESIDENT.

1st. The President shall be the executive officer of the society, and of the Executive Board; and it shall be his duty to see that the rules and regulations of the society, and of the Executive Board, are duly enforced and obeyed.

2d. He may, in his discretion, and in the lack of needful rules, during the recesses of the society and of the board, prescribe rules for the management of the interests or business of the society, such rules to continue in force till the next session of the Executive Board, and until by its action they shall have become no longer necessary.

3d. He shall act in conjunction with the Secretary in the preparation of pro-

grammes, or orders of business for the sessions of the society; and in the devising of plans and processes for the maintenance of its interests.

4th. He shall have the best interests of the society at heart, and shall lead in forwarding any and all enterprises calculated to add to its permanency, or to increase its usefulness, and establish it more firmly in the public confidence.

II.—VICE PRESIDENTS.

1st. The President may, at any time, call upon any one of the Vice Presidents to occupy the chair and conduct the exercises of the meeting.

2d. In the absence of the President, any Vice President may assume the chair and conduct the exercises of the sessions.

3d. It shall be the duty of the Vice Presidents, according to the best of their ability and opportunity, to aid in increasing the membership of the society in their several localities, and in bringing its objects and interests home to the apprehension of their people.

III.—THE SECRETARY.

1st. The Secretary shall be the recording, corresponding, and accounting officer of the society, and he shall also be, jointly with the business committee, its financial and auditing officer.

2d. He shall incur no expenditure of a large or doubtful character, except with the sanction of the Executive Board, or of the business committee.

3d. He shall submit all bills or claims against the society to the business committee for approval, and endorsement to that effect, before drawing his order upon the Treasurer for the payment of the same.

4th. He shall attend all meetings of the society, and of the Executive Board, and shall keep a faithful record of their proceedings.

5th. He shall sign all certificates of membership, and all diplomas and certificates of merit awarded by the society.

6th. He shall have charge of the society's books and papers, excepting only such as by the advice or direction of the Executive Board shall be placed in charge of the Librarian, and he shall be responsible to the Board for the safe keeping of the property placed in his charge.

7th. He shall be the custodian of the seal of the society, and shall have authority to affix the same to documents when needful.

8th. He shall seek, by all suitable means, to secure the fullest announcement of the meetings of the society in this State, as well as in adjacent States, when such shall be found desirable.

9th. He shall, as far as practicable, cause the transactions of the society, together with such valuable or interesting papers as shall be read at its sessions, to be properly published, and thus placed within reach of the people of the State.

10th. It shall also be his duty, yearly, to prepare for publication the annual report of the society, together with such other matter as he shall deem proper, —he being aided in the selection of such matter by an advisory committee of the Executive Board.

IV.—THE TREASURER.

1st. All the funds of the society shall be paid into the hands of the Treasurer.

2d. He shall disburse the moneys of the society that shall come into his hands only upon the order of the Secretary, countersigned by the President.

3d. He shall keep the moneys received by the society for life memberships as a distinct fund, and shall invest the same under the advice and direction of the Executive Board, applying only the interest accruing thereon to the purposes of the general fund.

4th. Immediately upon assuming his office, and before entering upon its duties, he shall execute to the society an official bond with sufficient sureties, conditioned for the safe keeping and disbursement of the moneys of the society, and for the proper discharge of the farther duties of his office, in such sum as shall be specified by the Executive Board. Such bond shall receive the approval of the President, and shall be deposited with the Secretary.

5th. He shall, at the close of each year, report to the Executive Board the amount of money that shall have come into his hands during the year, the sources from which it has been derived, and the disposition made of the same.

V.—THE LIBRARIAN.

1st. The Librarian shall have the custody of the library of the society. He shall be appointed by the Executive Board, and may be displaced at its pleasure.

2d. He shall act jointly with the Secretary in the care and arrangement of the same, and in the reception, custody, and disposal of the volumes of transactions annually supplied to the society by the State.

3d. He shall have the custody of the rooms assigned to the society at the State capitol, together with such books and other property as the society or the board shall direct to be deposited therein.

4th. He shall report annually, at the close of the year, to the Executive Board the amount and condition of the property in his hands.

VI.—THE EXECUTIVE BOARD.

1st. The Executive Board shall enact all rules and regulations for the management of the affairs of the society, determine the salaries of its officers, and assume the control and management of its exhibitions.

2d. It shall have power to displace any officer of the society for neglect of duty or abuse of position, and to fill all vacancies by appointment, to continue till the next annual election.

3d. The Board shall hold four regular sessions during the year, to occur at the times and places for the regular meetings of the society.

4th. Other meetings may be called by the Secretary, under the advice or direction of the President, or of a majority of its members, at such times and places as may be deemed most convenient; but in all such cases, each member must be notified of the time, place, and object of such meeting.

5th. It shall be the duty of the Board to carefully guard the general interests of the society, to watch over its finances, and to provide for its necessities as they shall arise.

6th. All important measures shall be submitted to this Board, but they may by the Board be re-submitted to the society with recommendations.

7th. The Board shall at the annual meeting submit through the Secretary, in connection with the reports of officers, such farther report upon the condition, interests, and prospects of the society as it shall judge necessary or expedient.

8th. Two members of the Executive Board are to be elected each year, to hold the office for three years, but if any such member shall absent himself from two or more consecutive meetings of the society, and of the Board, without reason satisfactory to the Board, the said Board may, in its discretion, consider the office vacant, and proceed to fill such vacancy by appointment, to continue till the next annual election.

VII.—THE BUSINESS COMMITTEE.

1st. It shall be the duty of the Executive Board, annually, upon entering upon the duties of the new year, to appoint, from their own number, three members, who shall constitute a Business Committee for the year.

2nd. All accounts or claims against the society, when presented to the Secretary for payment, shall, before payment, receive the sanction and endorsement of the Business Committee.

3rd. Such claims shall be submitted to this Committee and approved in duplicate; one copy to remain with the Secretary as his warrant for the payment of the same, and the other to be transmitted by him to the President, along with his order upon the Treasurer, as his warrant for countersigning the same.

4th. It shall be the duty of the Business Committee, upon application of the Secretary, during the recess of the Executive Board, to advise with him as to the expediency of making any contemplated but questionable expenditure for which occasion may arise during such recess.

VIII.—STANDING COMMITTEES.

1st. There shall be a standing Committee on Revision of the Catalogue, to be composed of one member from each of the five districts into which the State is, for this purpose, divided, with one member chosen from the State at large, who shall be the chairman of the Committee.

2nd. Each member of said Committee (except the chairman) is empowered and expected to choose a sub-committee for his district, of which he shall be chairman.

3rd. It shall be the duty of each sub-committee to collect and report, each year, to the general chairman, such facts respecting fruit culture in the district as shall promise to be of value in the revision of the catalogue.

4th. There shall be a standing Committee on New Fruits, to consist of a chairman, with as many associates as such chairman shall find it desirable to appoint.

5th. Such other standing committees may, from time to time, be appointed by the executive board as, in its discretion, it shall deem desirable or necessary.

6th. All standing committees are expected to report at the annual meeting in December any information of value to the society or its members that may have come to their knowledge during the year, as well as any scientific theories, deductions or facts that, in their opinion, may be useful in advancing the objects for which the society is laboring.

IX.—LIFE MEMBERSHIP FUND.

1st. All moneys coming into the treasury of the society in payment for life memberships shall constitute a perpetual fund, to be known as the life membership fund.

2d. The principal of this fund shall be invested by the treasurer under the advice and direction of the executive board.

3d. All interest accruing upon any portion of said fund shall constitute and become part of the fund of the society devoted to the payment of its ordinary expenses.

X.—MEETINGS OF THE SOCIETY.

1st. The society shall hold its first regular meeting for the year during the month of January or February for the inauguration of the officers chosen at the annual meeting held the previous December, as provided in Article IV. of the constitution, and also to arrange its plan of operations for the year.

2d. Its second regular meeting shall be held in the month of June at such date as shall best accommodate an exhibit of the early summer fruits.

3d. Its third regular meeting shall be at its annual exhibit of autumn and winter fruits, in the month of September or October.

4th. Its fourth regular meeting shall occur in connection with its annual election of officers, on the first Wednesday of December, as provided in Article IV. of the constitution.

5th. The times and places for the occurrence of these regular meetings, (excepting only the *time* of the annual meeting) shall be determined by the executive board.

6th. Other meetings may be called by the secretary, under the advice or direction of the members of the executive board, at times and places by them deemed expedient.

7th. In case of the calling of a special meeting for the election of officers of the society, in consequence of any failure to elect at the annual meeting, as provided in Section IV. of the constitution, all persons entitled as members to vote at such annual meeting shall be considered as retaining such membership for such purpose until such election and until such officers so elected shall have been inducted into office.

XI.—RULES FOR DISCUSSIONS, ETC.

1st. The deliberations and discussions of the society shall be conducted in accordance with ordinary parliamentary usage.

XII.—AUXILIARY SOCIETIES.

1st. The society shall in all reasonable and proper ways encourage the formation of local horticultural or pomological societies auxiliary to this society in all such counties or other municipalities of this State as shall afford a reasonable prospect that they will be able, effectively, to maintain the same.

2d. It shall be the policy of this society in supervising the organization of such local auxiliaries to secure an identity of constitutional provisions throughout, and in so doing to ensure harmony among them; but at the same time it will not discourage the including by them of special or local objects in cases in which such shall be found desirable, so long as the introduction of the requisite provisions therefor into the constitution and by-laws of the auxiliary society shall not be deemed likely to interfere with the harmonious working of the whole.

3rd. Any person may become a full member of an auxiliary society, for one year, by paying into its treasury the sum of one dollar; and a compliance with

the provisions of clause fifth of these by-laws shall constitute him also a member of this society, for the same term.

4th. The wife, and the resident, single or unmarried daughters of any full member, may also become members of such auxiliary society upon the payment of fifty cents each: Provided, that in such case, such entire family shall become entitled to a single copy, only, of the current volume of the transactions of this society.

5th. On receipt of the names of such members, with the required fees, the Secretary shall immediately transmit their names and postoffice addresses, together with half the membership fee of each, to the Secretary of this society, who shall record the same and pay the money into the treasury for the benefit of the general fund.

6th. It shall be the duty of the Secretary, on receipt of such remittance, with list of members, to supply such auxiliary society with a certificate of membership in this society for one year, together with a copy of the current volume of transactions for each full member so remitted for.

7th. The proceedings of such auxiliary societies shall, at the close of the year, be forwarded, in succinct form, to the Secretary of this society, to be by him incorporated into the annual volume of transactions, accompanied by a list of its members for the year.

8th. The auxiliary societies shall, as far as practicable, be made the medium for the distribution of the annual volumes of the transactions of the society; the nuclei for its meetings, and the means of creating interest therein, as well as the means of collecting such facts or other information or material as shall, from time to time, become needful or desirable in the conducting of its various operations.

XIII.—AMENDMENTS, ADDITIONS, SUSPENSIONS.

1st. Amendments or additions to these by-laws may be made, by a majority vote of the Executive Board, at any meeting; but if objection shall be made the same shall 'lie upon the table' till the next regular meeting of the Board.

2nd. These by-laws, or any one or more of them, may be suspended for the time, by order of a majority of all the members of the society present and voting.

3rd. A proposition, in the general meeting of the society, for an amendment or addition to these by-laws shall be referred to the Executive Board for consideration and decision; but the society may submit therewith its advice or request.

4th. All amendments of the constitutions and by-laws of auxiliary societies shall, before they shall take effect, be submitted to the Executive Board of this society, by whom their approval or rejection shall be considered upon the principle provided in section XII., clause 2nd, and the determination of said Executive Board shall be final and binding upon the auxiliary society.



PROCEEDINGS OF THE WINTER MEETING,

HELD IN HILLSDALE, FEBRUARY 11TH, 12TH, 13TH, 1880.

At Hillsdale, in the month of February of each year, a farmers' institute is held, under the auspices of the county agricultural society. The executive committee of that society extended an invitation to the State Pomological Society to hold its winter meeting in connection with this institute.

In acceptance of this invitation the joint session of the two societies was called at Underwood's Hall, in the city of Hillsdale, February 11th, 1880. The members of the State Pomological Society were the guests of the County Agricultural Society. The meeting opened on Wednesday afternoon, February 11th, at two o'clock, with President Lyon in the chair.

CORRESPONDENCE.

Under the head of correspondence the Secretary read letters from a number of prominent horticulturists regretting their inability to be present. One from Hon. Emmons Buell, of Kalamazoo, had in it the following characteristic sentence:

"I am not a little amused sometimes when persons come to me to get information in regard to trees, fruits, and their management. They want I should give them information that will save them hundreds of dollars in their future selection and management of fruit; and when I offer them all I know, and a hundred fold more, in a volume of the transactions of our Society, for the mere pittance of one dollar, they have the graceless impudence to reply that they cannot afford it."

A letter from Mr. Nathan Shotwell, of Concord, Jackson county, embodied some very sensible thoughts, which are reproduced here, on the

CARE OF THE ORCHARD.

The successful cultivation of fruit in Michigan has a greater retinue of obstacles to surmount than that of any other department of labor that requires the cultivation of the soil. The simple possession of land in a good state of cultivation, and the putting of it out to fruit trees, is but the beginning of the cares and anxieties, and the labor and expense necessary to make the enterprise result in the most successful investments. How often do we observe unskilled people in the business, setting out young trees in meadows and old pastures, and digging holes in the sod just sufficient to inclose the roots, and then after a year or two wonder why so many of their trees have died, and that the balance are so unthrifty. And even others, who have cultivated the soil, mulched and pruned the trees, and have a fine, thrifty orchard, and have made

a good selection of those varieties that are the most profuse bearers, fine size, and the most enticing colors for market purposes, yet so large a per cent of the fruit is wholly or partially ruined by insects that the market value of the productions of the orchard is very materially reduced.

This last enemy of the fruit grower is the most difficult obstacle he has to surmount. The migratory habits of the moths, and the dilatory habits of the farmers generally toward their destruction, make it quite difficult for those that are anxious and willing to rid their orchards of these pests to accomplish very valuable results, as the moths are so ready to migrate from the neglected orchards of their neighbors. Concert of action and persistent, unyielding purpose throughout a neighborhood is the most feasible plan that can be adopted to save our fruit from such wholesale waste as the people of Michigan are now sustaining. Nearly one-half of our apple fruit is more or less injured (much of it entirely unfit for use), in consequence of allowing the codling moth free access to our orchards. Shall we not organize a more thorough and systematic warfare against this most potent enemy of the fruit problem than has heretofore been organized in Southern Michigan, and save at least a much larger proportion than we now do, of as fine and delicious fruit as the world produces.

Civilization proves nearly as uncongenial to the feathered tribe as it does to the Indians of the forest; both largely disappear before its approach; and as these insects, so destructive to the farmers or fruit growers' interest, were designed to increase and develop as food for the bird, unless some other agencies are adopted for their destruction, horticulturists must continue to sustain serious losses by their destructive habits. Some kinds of apples are much less liable to injury from the works of the moth than others, and much might be gained by raising such varieties as are least liable to injury from that source. The Golden Russet is usually quite free from injury from this source, while the Roxbury Russet is usually one of the most liable to injury. The Baldwin is much less liable than the Swaar, though it is by no means exempt.

With all the failings of the orchard, a little cultivation, pruning and mulching, and fighting the worms as best we can, will usually reward the husbandman as well as capital invested in any other enterprise.

The paper of the afternoon was given by Alexander Hewett of Hillsdale. The topic was scarcely a horticultural one, but its treatment and the discussion which followed it brought in so many items of horticultural import, that the essay is appropriately given a place in these transactions.

HOW TO ENHANCE THE VALUE OF A FARM TO SELL OR TO KEEP.

The committee in arranging the programme for this meeting have assigned to me the topic, "How best to enhance the value of a farm to hold or to sell." The things necessary to be done in order to give an increased value to farm property depends very much upon the situation and condition of the farm. In my opinion, the secret of success in an undertaking of this kind is not so much in telling what ought to be done and how it should be done, as in inducing our people to do what they already know would be conducive to the object sought. However, I will suggest a few things that will apply as a means of improvement upon some of the farms in our locality.

If the buildings are not comfortable and convenient, well arranged and in good repair, they should be made so; if new ones are needed, those of a substantial character should be erected, always having in view their proper site in connection with other buildings, the highway, and various surroundings.

The old rail fences that have served their time should be replaced to the extent actually needed by a straight post and board fence. Four ordinary fence boards with a two by four piece spiked upon the tops of the posts make a fence that appears well and is not easily broken by cattle or horses. Where stone are plenty they can be used in establishing permanent fences. But we never expect to see the farms of Michigan fenced into as small enclosures again after the rails now in use become worthless, and really we hardly think it desirable. In many instances it would be an improvement to remove them entirely and destroy the weeds and thistles and briars that have been allowed to grow alongside of them.

Another very important matter that demands our attention is a well conducted system of underdraining. I am confident that many farmers do not realize the necessity of such a work. It should not be overlooked in our endeavors to render our lands more fruitful and productive.

An abundant supply of good water is another consideration never to be overlooked. If there be not springs and brooks on the premises which never fail, wells should be sunk and facilities provided for raising the water and conducting it into tanks arranged for that purpose.

A healthy location is always desirable. This should be secured by providing for man and beast, as far as possible, pure air and clean water. Hence no stagnant pools should be allowed to stand in the neighborhood impregnating the air with their foul evaporations, or to be used as drink for the beasts of the field. It is a mistake to expect good butter, good beef, and good health where such nuisances are allowed, and the water from such places should be drained off underground. Another matter that is worthy of recognition in connection with other things that go to enhance the value of farm property, is a good supply of timber. In this State, as in other timbered countries, the labor of pioneer life was chiefly devoted to removing the timber from the land. With the great anxiety to get rid of the dense forests and make improvements, we scarcely stopped for a moment to consider the effect of our work. We now realize the fact that great climatic changes have come over the country, and that timber is becoming scarce where with a little more care there might have been a plenty; and still this work of destruction is now going on in the newer portions of the State. We sometimes feel like interfering a little, and saying to the axman, "Hold on; spare some of those noble forest trees." But I am digressing; I started to say that every farm should have a timbered lot, either of natural forest trees or from transplanting such varieties as are congenial to it and would be the most valuable when grown up.

Belts of timber composed of deciduous trees, interspersed with evergreens, so arranged as to break the prevailing winds, would be a thing of beauty, of comfort, and eventually of profit. Trees along the roadside for shade also add to the good appearance of a country. A limited number of ornamental trees, both of evergreen and deciduous varieties, properly arranged in the vicinity of farm buildings, together with shrubs and flowers in near proximity to the dwelling, give an air of cheerfulness and beauty to the place which tends to make such a home desirable and attractive. Governor Bagley did a noble act when he set apart one day of the centennial year to be devoted to tree planting, and I hope other eminent men will renew the proclamation, and that the inhabitants will fall in with the enterprise so that the people of the next centennial may see living witnesses of the industry of their forefathers. All kinds of fruit trees that are adapted to our soil and climate should have a place on every farm. Plant liberally, especially of cherries, for the boys and the birds.

Teach the former never to destroy or intimidate the latter, but rather to encourage them to make their homes in our midst. Birds are among our best friends; they cheer us with their enlivening songs and aid us in the destruction of thousands of insects that are ready to destroy our grain and fruit. Not only farmers and pomologists, but every one that has an opportunity ought to encourage the birds in their work by giving them undisturbed resting places in forests and ornamental trees.

In Hillsdale county the apple is the principal fruit grown for shipping purposes. As a source of profit aside from home consumption every farm should have a good apple orchard. If not already provided it should be attended to without delay; it will enhance the value of the premises as readily as anything that can be done.

Do not be afraid of overdoing the fruit business; there are several large cities and a vast extent of country that look to Michigan for their apples. In planting an orchard be careful to select the proper place; subsoil and enrich the ground, and do not set out too many different kinds. A few of the early and fall apples only are needed; half a dozen varieties of the best winter and good keeping sorts are enough. Study the reports of the Michigan Pomological Society and practice their precepts and success is sure.

Farmers in a comparatively new country, especially where the land is naturally fertile, sometimes seem to forget that there is danger of exhausting the soil of its grain producing qualities until the fact becomes apparent from the scanty and diminished yield. How can land in this condition be brought back and its fertility restored and at the same time give some profit to its owner? I answer by an entire change of system. Let the grain business be secondary for a few years, and assume that grass is king. Use red clover with plaster applied; timothy and red-top with a liberal dressing of barnyard manure, or anything that will make grass grow, remembering not to feed down too closely. These will eventually give a good supply of green clover with an abundance of roots, or a closely matted turf, which in due time can be turned under with the plow, and the productive elements to a certain degree restored. Some good stock may be kept at a profit to consume the hay and coarse grain and roots which should all be fed out on the premises. Follow this system for a few years, keeping in mind the grand object of attainment, and success will crown your efforts by a rich remuneration of abundant harvests.

Perhaps there are some in our midst that delay from time to time the planting of trees or the making of other improvements, the benefit of which seems to be in the distant future, that excuse themselves upon the ground that they cannot afford to wait so long for the result. Now it is a part of the vocation of pomologists and farmers generally *to wait*. It takes time to grow trees, and time to develop their fruit. The grain and stock of the farm require time to bring them to maturity and profit. We must wait; and yet this is not an idle waiting. When the necessary work in connection with the production of these things is done, we can turn our attention to other matters. Time will be filled, so really it costs nothing to wait, and it is hardly fair to make it a pretext for neglect.

With some of us, in our desire to increase the extent of our farms, we overlook the fact that better cultivation of what we already possess would be much more to our advantage. Work should be thoroughly done and in proper season, remembering the adage that "Whatever is worth doing, is worth doing well;" and also, "Never put off till to-morrow what should be done to-day." Usually the different kinds of work on a farm follow each other in regular suc-

cession. With a little forethought and calculation, the permanent improvements needed can be made at intervals of time without interfering with the regular routine of business.

From year to year the pursuit of agriculture is gaining respectability. The cultivation of the soil is no longer looked upon as a low and degrading business, but is taking rank among the noblest professions of the age. The appearance of our buildings with their surroundings; our orchards and woodlands; our beautiful fields and well-bred stock, should always be evidence of our having lived in an age of improvement.

There are many other things that enhance the value of farm property, a few of which are good roads, postal routes, markets, railroads, manufacturing establishments, schoolhouses with well conducted schools, churches and religious privileges, neighborhoods made up of steady peaceable, industrious inhabitants, interested in carrying forward the respective industries of the country. These things should be encouraged and maintained in connection with temperance and frugality, and the farmers as well as men of other professions will be rewarded accordingly.

President Smith of the county agricultural society took issue with the essayist upon the question of timber enhancing the value of a farm. As a matter of beauty in connection with the farm, the timber lot is all right; as affecting the climate, we know very little; but as a matter of economy in our part of the State, the crop which can be grown upon the timber lot from year to year will purchase the fuel and timber required and yield a handsome profit beside. There is a good deal of sentiment in this wood-lot business,—more sentiment than money.

Mr. Hewett.—The profit of a wood-lot is not alone in the timber, wood, and lumber which it will annually furnish, but in the protection which it furnishes the country. If all should follow Mr. Smith's advice, we would have cyclones in the place of our pleasant breezes, and tornadoes as a substitute for our timely rains.

Question.—Do you think railroads wholly a benefit?

Hr. Hewett.—There is a limit, to be sure, beyond which, if the building of railroads should reach, they would be no longer a benefit; but railroads certainly have a large share in the work of enhancing the value of our farms.

C. R. Coryell, Jonesville.—I do not think we need save timber lots to aid us in fencing when so simple and tasty a fence can be made of barbed wire. But, on the other hand, trees along the line of fences make good posts to which the wire can be attached, and act as shelter belts as well.

J. Austin Scott, Ann Arbor.—I have been a fruit grower and estimate very highly the advantages accruing from having a good orchard interest connected with each farm, and can fully endorse the sentiment of the paper in this regard. But I do believe if the farmers of Michigan should act upon the suggestion of there being more money in the crops that could be grown on the timber lots than there is in the timber, our fruit interests would be greatly jeopardized.

J. Webster Childs, Ypsilanti.—I shall cast my lot with the men who will preserve a goodly amount of timber. As most farmers are situated in the southern part of our State, there is as much money and as much comfort taken out of the forty-acre timber lot as out of the adjoining forty acres of cleared land, provided there is proper management. Then if you take into consideration the fact that without the timber you cannot have the birds, and without

the birds you will be eaten up with insects, I have no hesitancy in saying the wood lots are the most profitable adjuncts of the farm.

President Lyon.—What proportion of land would you devote to a wood lot?

Mr. Childs.—That would depend on the size of the farm. Perhaps, generally speaking, twenty per cent would be a good proportion.

A voice.—Then you would save eight acres out of a forty for timber?

Mr. Childs.—If I had but forty acres I would *buy a wood lot*.

Pres. Smith.—One acre in wheat will pay better than ten in wood.

J. Austin Scott.—I doubt it very much, for it is generally conceded that on rich oak lands ten cords of wood per acre each year would not exaggerate the growth.

Mr. E. W. Cottrell, Detroit.—If all should cut the wood off and sow wheat would not the result be disastrous?

Mr. Smith.—Yes, but there is no danger of this. In my estimates I was simply looking at the immediate annual profit.

Mr. Campbell, of Washtenaw, cited a number of instances in his own experience where timber saved had not been in any way profitable.

The discussion of Mr. Hewitt's paper extended to good roads, shade trees, good buildings, etc., and was carried on by Messrs. S. N. Betts of Adams, W. H. Reynolds of Hillsdale, Parshall and Baldwin of Washtenaw, Willets of Cambria and others.

REVISION OF CONSTITUTION.

A committee, which was appointed to draft a new constitution and new by-laws for the Pomological Society at the Allegan meeting, reported drafts of constitution, and by-laws, and the question of changing the name from Pomological Society to Horticultural Society, was discussed informally. And as a matter of curiosity a vote was taken on the change of name thus proposed, which vote resulted in favor of the change—only the members of the Pomological Society voting—nineteen voting for the change and five against.

The Secretary was instructed to give the requisite notice of the submission of the constitution and by-laws to next meeting.

Wednesday Evening Session.

At the evening session there was an attendance of about 125 and a good deal of interest manifested in the papers and addresses. Excellent music was furnished to give variety to the exercises, which was appreciated by the audience in sundry demonstrations of enjoyment.

President Smith, of the County Agricultural Society, occupied the chair.

COMMITTEES AND INVITATIONS.

President Lyon announced the committees as follows:

On Exhibit—J. S. Woodward, Lockport, N. Y.; H. P. Hanford, Bristol, Indiana; E. W. Cottrell, Detroit, Michigan.

On Resolutions—J. W. Childs, Ypsilanti; W. N. Cook, Grand Rapids; J. D. Baldwin, Ann Arbor.

Invitations were received from South Haven and from Ann Arbor for the holding of the next meeting of the Pomological Society at those places. These invitations were referred to the Executive Committee.

Next came the welcome address by Mayor Whelan, who spoke substantially as follows:

Mr. President, Ladies and Gentlemen of the Pomological Society:

I am requested to bid you welcome on behalf of Hillsdale County Agricultural Society. I bid you welcome on behalf of the citizens of this city, and of the county. It is pleasant to welcome you here, because of the good you have done to the State, and because of the interest that we have in the objects of your society. Our great progenitor was a pomologist.

Your society has its effect even outside of Michigan. I see your reports quoted in the far New England States, in New York, and Canada, besides in all of the adjoining States. I believe that this society has more than quadrupled the pomological products of this State. It is the pride of agriculture.

You have developed the fact that you can grow a better fruit in our State than can be grown in any other part of the country. It is only a few years ago that the fruit districts of Michigan were only a narrow belt along the shore of Lake Michigan.

Dr. Whelan spoke of the elevation of Hillsdale county, and of the effect of the thousand and one lakelets in the county, which furnish the requisite moisture to the air, making Hillsdale county adapted to fruit culture.

We have found that we can produce even peaches in this county, and peaches too that compare favorably with those grown on the lake shore.

Your society has done much good in its ten or twelve years of existence, in its reports of failures as well as in its reports of successes. It is equally essential that failures as well as successes should be reported, for failures are just as good educators as successes.

We welcome you here that you may induce a greater interest here in your objects. We hope that when you come here a few years hence you will see a marked improvement in pomological interests.

President Lyon of the Pomological Society responded as follows:

Mr. President and Gentlemen of the Hillsdale County Agricultural Society:

We were hardly human were we not flattered by the manner in which you have welcomed us. We confess that we are flattered. I can remember that when Michigan was being settled and developed there was an impression that Michigan could not grow fruit successfully. It took years to disabuse us of that thought, although many of us came from the fruit districts of Western New York with our taste for fruit.

It is only a few years ago that it was discovered that the St. Joe country would grow good peaches, and then we were under the impression that the fruit district was limited to a very small belt, and it took a long time to disabuse our minds of that impression.

We used to think that we must plant our orchards in low places that they might be protected from the severe storms by the hills surrounding. But after a long time and through progressive steps we have become disabused of that idea, and now we plant them on the highest ground. There is only a small portion, comparatively, of our whole country that is adapted to fruit culture, and especially to peach growing, and it seems that Michigan is peculiarly adapted to fruit growing. This is owing to the physical geography of the State and to the adaptability of the climate. There are no varieties that are equally adapted to the whole country, or even to the whole State. These vary in adaptability as the different local influences. We came here hoping to create enthusiasm in horticultural subjects.

Upon my first visit to Hillsdale about two years ago, at the time of your annual fair, I must confess that I was very much surprised. I found a very fine show of fruit,—much finer than I had expected. You need have no fears of success in fruit growing in Hillsdale county if you will take the ordinary precautions. As in ordinary farming, so in fruit growing it requires good cultivation to get good results.

The practice of planting trees and leaving them there, or in cropping the ground and expecting the tree to grow, and to get a full crop of grain at the same time is being done away with. Soil is just as essential to trees as to crops.

We have other things to contend with, and among these is the question of varieties. I have seen those who were planting an orchard go to a nursery and there select varieties that they knew to be nearly worthless, simply because the trees looked finer. Some varieties are not fine-looking trees in the nursery because they grow slowly, while they may be the very best to plant in orchard. When we have educated the masses so that they may select a dozen or two varieties properly, we have accomplished an important mission.

Following these addresses, the audience listened to an excellent address on

THE BEST MEANS TO PERPETUATE THE GROWTH OF THE SOCIETY,

by W. K. Gibson of Jackson.

It is not enough that this society should have an existence secured by every guaranty which can make such existence permanent: existence is necessary, and permanence is indispensable to enable it to accomplish the object of its organization; yet both may be secured, and the society nevertheless fail in securing fully the end for which it exists.

The field of our work is a most inviting one. With greater variety of soil and climate than most States possess, almost inclosed by the great northern lakes, with a population of more than ordinary culture and intelligence, horticulture and pomology should receive the highest attention. Our apples already seek a market in Europe, and our peaches and smaller fruits find their way to Chicago, and thence to the far west. The fruit crop ranks next to the grain crop, and every year testifies to its growing importance.

Notwithstanding all this, at every meeting of the society, the fact is brought fully to our realization that but very few of our people, indeed of fruit-growers themselves, are really interested in the work of the society. I should not be much out of the way were I to say that there is less intelligent labor devoted to fruit culture than to any of the branches of business in which our people are engaged. It seems to be a common idea that a fruit tree, because it is a tree, will grow anywhere, and anyhow, and bear good fruit. If nature was not more kind than man, our orchards all over the land would refuse to yield their rich harvests of fruit, and be of no more value than the wild crab which grows by our roadside. What is the reason of all this? The answer is because the importance of the subject is not realized. When our people come to understand the results which always follow intelligent fruit culture,—when trees and plants come to be regarded as living organisms, dependent upon the conditions of soil, and susceptible as animals to location and climatic changes, then we may hope that horticulture will be studied and intelligently practiced all over the land. To secure this, is the object and aim of this society; and just so far as we fail in this, our work is incomplete.

How can we best awaken such an interest,—how best challenge attention to

the subject? It is far easier to point out defects than to provide remedies, and it is easier, even to suggest remedies, than to put them into practical and successful operation.

We must admit, however, that there are serious defects in our present system. Holding only four or five meetings a year open for mutual exchange of opinion and discussion, the society is unable to reach the masses of the people, except by means of its published annual reports. These books, though of great value, result in no concerted and united efforts in the different localities in the interests of horticulture, and while it is true that here and there individual attention is awakened, still the progress made is too slow to meet the needs of the society. Some way must be provided for bringing the society in nearer relation to the masses of the people. It should have an active, permanent existence everywhere in the State. Its membership should be enlarged and extended, local operations and results should be more fully gathered up and preserved, and frequent meetings should be held in every county where horticultural experiments can be discussed and results ascertained. The State society cannot do the work for each county.

First. Because it has no machinery by which to do it.

Second. Because the work is purely local in its character, and if done at all, must be done by those who have a thorough knowledge of local interests and operations, and yet the State society is of little value unless it can gather up the results of all the different localities. No system can be a good one which shall attempt to impart horticultural information to the whole State, unless it is based upon accurate knowledge of the conditions of soil and climate in each locality.

These defects in our present system seem to me to suggest a remedy, and I submit to the society the outline of a plan for its consideration which is not free from defects in its details, nor from difficulties in its execution, but better, I am persuaded, than our present system. It is, briefly, this:

That there be appointed, and paid by this society, some competent person, whose duty it shall be to visit every county interested in fruit culture, and establish, wherever advisable, a local society which shall be a branch of the State society, such local societies to be governed by a common constitution and be supported by voluntary assessments of its members, who shall also be members of this society upon the payment of a membership fee, a portion of which shall go to the local branch, and the balance to the State society. These local branches shall hold regular meetings, make regular reports to the State society, and send delegates to its meetings, and each member shall be entitled to receive a copy of the annual report. It shall be the duty of the person organizing such branch to visit them from time to time, encourage their growth, see that their meetings are kept up, and that they are in good working condition.

I have only indicated the general features of the plan, leaving the details to be filled out as your wisdom may suggest. I believe it can be made successful only by employing some one interested in the work, who will give it his whole time, and see that the various branches are encouraged and kept up. It is only a question of work. It can be made successful, and it remains for us to say whether it shall be done.

By this plan we make the State society a local society in every county, we extend our membership, and establish communication with every locality in the State. We increase the value of our annual printed reports, and secure for them a more satisfactory circulation.

The value of information on horticulture and fruit raising, derived from the different localities in the State, depends upon its accuracy derived from a comparison of extended results and experiments.

Heretofore it has often been the case that the reports made from the different sections have contained individual opinions, and not results obtained from a comparison of many experiments. By this plan, also, greater interest is awakened upon the subject of fruit culture, which will lead naturally to good results.

But it is not necessary to point out all the benefits which would result from the establishment and maintenance of the local branches of the State society, and it is not my object now to discuss the plan in all its bearings, or to attempt to measure its effects. I submit it for your consideration, hoping that if it may not be adopted, it may lead to the suggestion of some plan which may be more productive of good than the present system under which we are now operating.

Mr. Gibson supplemented his paper with a very earnest tribute to the men who had by means of individual exertions built up the society, and given it the high character for which it is noted abroad. He said it was time that the people put their shoulders to the burden and helped by their earnest support to continue the usefulness of the society.

Following Mr. Gibson's address, Mr. Lyon opened the discussion on

EVERGREENS FOR THE FARM.

He said that unquestionably the evergreens were the most suitable of any trees to plant upon the farm for protection. Very few deciduous trees can approximate in value the better evergreens for this purpose. The appreciation of this protection comes at a time when the trees cannot be planted out, and at the times when the planting should be done the necessity is not felt. Like the fiddler under the leaky roof,—when it was fair weather he cared not for the leaks, and when it rained he could not fix them; so he continued on with no change for the better. In the same way our farms go without the protection that might be easily given in the proper time by the planting of a few trees.

There is no question but that the judicious planting of a few evergreens will add very largely to the value of our farms either to sell or to keep.

The more heat that is required to keep up the vitality of animals, the more food must be given them; hence the value of warm barns in winter. It is far cheaper to grow evergreens than to spend so much in keeping up tight barns; besides, the protection given by evergreen screens does not impair the health of animals by checking ventilation as is the case in a close barn. If any of you have ever traveled over a bleak district, as I have oftentimes done on severe days, and come upon the grateful protection of Norway spruces, you can form some estimate of their value as a screen.

Every man who has a garden knows how difficult it is to preserve some things over winter and through the spring on account of the severe blasts of wind, and again, how planting must be deferred because of an occasional blast that will come even after the warm days of spring have opened. A screen of evergreens to protect a garden from these winds can be planted at a very slight expense, and can be maintained at actually no cost thereafter. These western and northwestern winds are perilous to vegetation in spring oftentimes even when they are not freezing cold. What a satisfaction to have a row of spruce,

cedar, or hemlock to stand guard in these emergencies. In relation to the orchard, the evergreens as a protective agency perform a very important part. There are men here who can point to instances in their own experience where a slight protection given by a screen of evergreens might have saved trees from destruction.

WHAT EVERGREENS TO USE.

There is a wide range of evergreens to choose from, and some of the very best are those that can be obtained the most easily and at the least expense. I would mention first the white pine. Its great value as a timber tree is too well understood to require consideration, especially since it would be foreign to our present purpose. Accustomed, as we are, to see this as grown in its native habitat, with tall, naked trunk, and a few vigorous branches at the top only, we need to study it in younger specimens, as they may be frequently seen in fields or open spaces, under the full play of air and sunlight, if we would properly comprehend its value for the purposes under consideration. Grown thus it maintains fully the vigor of its lower branches, and remains clothed with foliage to the ground. Its foliage is finer and softer than that of any of the other pines usually seen in our climate, and has a somewhat glaucous appearance. Like all the other pines, it does not readily respond to the use of the knife and shears, and it is therefore better adapted to tall, open screens, where there will be little necessity for their use. If planted as a single specimen, it demands a wide space in which properly to develop and display its matured beauties. Under such circumstances it will be found to have few if any superiors, even as a lawn tree, although we cannot feel sure that, when of large size and mature age, it will not, even here, vindicate its long indulged habit of dwarfing and casting off its lower clothing.

The Austrian pine is a beautiful, tall, round-headed tree, which seems to be entirely hardy in our climate, as indeed it is throughout the northern States. Its stout, vigorous shoots, and its long and comparatively rigid foliage, maintaining its color unchanged throughout the winter, render it a desirable tree, whether for screen or shade. It can hardly be commended for close planting, to be subjected to shearing or cutting in, to produce dense growth, since at the best it yields very reluctantly to such treatment. In fact, if a shoot is cut away, or even a leading bud destroyed, it often requires a long time to supply the deficiency from the side growths. This tree, therefore, while it is quite effective as a single specimen upon the lawn, will be found most effective for the purposes now under consideration, when employed for tall, open screens or windbreaks, in which, as a rule, pruning will not become necessary.

The Scotch pine, although not a native, seems to take very kindly to our climates and soils. Probably its vigorous habit, and the ease and safety of removal, may have something to do with its popularity; still, it is a very rapid grower, even too much so to become fully effective for the purposes we are considering, since its very vigor creates a loose, open habit of the tree, whether young or old. We doubt if any system of pruning or shearing can be made to fully remedy this tendency, although frequent removal or judicious root-pruning, while young, might suffice for the purpose, as it no doubt would with any and all the pines already noticed. Such a process, however, must prove a serious drawback to its longevity, and for that reason objectionable. The only other remedy to be implicitly relied upon is to plant in double or even tripple rows, and, in so doing substitute breadth for density, a process involving an increase in the number of trees to be planted, as well as in the amount

of land occupied, one, however, that may find a recompense in a surplus growth, which may ultimately be cut away and devoted to economical purposes.

The balsam fir, or Canada balsam, is a common native tree, which, while young, is exceedingly beautiful, and on some accounts would upon short acquaintance seem well adapted to use for screens; but unfortunately its beauty is very short lived. As it acquires age and size it soon loses its lower branches, and leaves only a few vigorous healthy ones near the top, while its general appearance becomes scraggy and unsightly, rendering it quite unsuitable for this purpose.

The hemlock of our Michigan forests needs no introduction to the people of the Peninsular State. Indeed the fact that it is so common a tree among us would seem to be the chief obstacle to its general adoption for the purpose under consideration. Josiah Hoopes, the author of a valuable book on evergreens, characterizes it as the most beautiful of all evergreens, whether native or foreign, an estimate in which we most fully and heartily concur. Indeed, with the single exception of its lack of value as a *timber tree*, I see little reason why it should rank lower than any other, whether for ornamental or utilitarian purposes.

The hemlock has acquired the reputation of being impatient of removal, and this is doubtless true when taken directly from the forest to the open ground; but when gradually hardened to exposure, and repeatedly transplanted, as is the case when nursery grown, this difficulty to a great extent disappears and the tree becomes supplied with an abundance of fibrous roots near the trunk, rendering the process of removal comparatively easy and safe. Under favorable circumstances the hemlock grows to the largest size. In open exposures it will rarely lose its lower branches, but will prove as effective as can be desired when planted as a single tree, while it is perfectly at home under the shears when planted in the screen, and equally so in open rows as a wind-break, where, if the sides are open to the sun and air, it will remain clothed to the very base. In no place, however, so far as I have observed, does it develop a higher type of beauty than in a compact screen. For this purpose it may be planted quite close (if immediate effect is sought) and sheared to a regular conical or half oval form of the desired height; if to shut out a view, eight or ten feet in height will generally suffice, and when the young twigs commence their growth the entire screen will put on the appearance, to the casual observer, of an immense bouquet of yellow, white and green, with the several sprays drooping the one over the other in the most graceful manner imaginable. As the sprays lengthen with the advancing season they of course lose this variety of color, and put on the plain lively green peculiar to this tree; but the sprays retain their graceful drooping habit throughout the year. I can in no way more effectively convey my idea of the beauty and desirableness of this tree than by saying, if unfortunately I were for any reason compelled to content myself with a single evergreen, and to shut my eyes forever upon all others, I would with little hesitation say give us the hemlock.

The Norway spruce, although not "to the manor born," has been long enough a denizen of our soil and climate to have fully established a reputation as an American tree. Perfectly hardy under all circumstances in which hardiness may reasonably be expected, its great vigor and longevity, as well as the persistence with which it holds its foliage and remains clothed with branches to its base, together with the great size it will acquire under favorable circumstances have long since constituted it *the evergreen for the million*. When of the needful size and age, the younger side shoots usually assume a half droop-

ing character, that taken in connection with the tall spire-like habit of the tree render it, even when planted singly, an object of great beauty. It sometimes browns in exposed positions in winter, but it regains its bright color promptly with the opening of spring, and may be pruned or sheared into almost any desired form with impunity. On this account it proves a very satisfactory plant for close screens, even when they are to be kept at only a moderate height.

I however wish to be distinctly understood as disliking the practice of shearing *single trees* of this or any other evergreen; although there may be exceptional cases in which it would be admissible. I even more thoroughly reprehend the practice of cutting away the lower branches, which is sometimes, however, felt to be necessary for the reason that the space assigned has come to be too limited. If a Norway spruce is expected to develop its full beauty as a mature tree, it should have a clear space of twenty or twenty-five feet in all directions from the trunk.

The Arbor Vitæ is called hardy, although occasionally it has been known to suffer. It has not the beauty of the hemlock, but transplants more easily. In winter the great objection to it is the brown color it assumes, which in winter detracts seriously from its beauty.

WHERE TO OBTAIN TREES.

The more common process is to go to the forest, select such young trees as seem adapted to the purpose, dig them by cutting off all the roots at a few inches distance from the trunk, thus cutting away probably nine-tenths of the entire root system; remove them from the shade and shelter of other trees, and probably transfer them to the open ground, when they, while yet enfeebled by the process, must be subjected to the full power of the summer's sun and wind. This is doubtless many times done as a matter of economy, although after such trees have died, and been several times replaced, with the loss of several years time, as is usually the case, there would seem to be abundant reason to doubt the wisdom and even the economy of this process.

Nursery trees are usually thickly grown in the seed bed, and when but one or two years old are taken up, the roots cut back and the seedlings thickly planted in rows, where they are allowed to stand till they demand more space, when they are again transplanted, and as a necessity the roots are again shortened and they are given a wider space for growth. Trees grown in this manner are invariably found to have a dense mass of fibrous roots, and hence can be transplanted with greater certainty, and will, moreover, recover from the shock of removal with far greater promptness. Such trees are also more fully hardened by exposure to the sun, a fact which adds greatly to their ability to bear the shock of removal.

WHERE TO PLANT THEM.

It is by no means uncommon to see a fine residence with suitable outbuildings, standing exposed to the full force of westerly and northerly winds, even where the farm appointments otherwise unmistakably indicate an owner in easy circumstances and abundantly able to supply the needful protection. On such a place they should, beyond doubt, be planted so as to shelter the house and lawns, and the yards occupied by the farm stock, not merely as a matter of comfort to man and animals, but also as an economical investment to save the stock of fuel, and to economize the food consumed by stock in the process of generating animal heat. This object subserved, I would next, if still need-

ful, plant a low screen (but one that will grow to be ten or twelve feet high) along the exposed side or sides of the kitchen garden, and in so doing provide the needful shelter for early vegetables, as well as a nook for the location of a hot-bed and cold frames. Having provided for these needs, attention may next be given to the screening of the orchards from westerly or northerly winds. I am not unaware that some intelligent orchardists doubt the advantage of such protection, but I fancy that after a man shall have lost, or nearly lost, for year after year, the one-fourth or one-half of his crop of fruit from the effect of high winds, just before the picking season, a slight effort of the imagination might convince him that less wind and more fruit might have been for his advantage.

There are, doubtless, reasons why a screen for the protection of an orchard, especially if it contains cherries, plums, peaches, or even pears, should be open enough to impede but not fully arrest the circulation of the air, but this I regard as more important with reference to the effect in summer in preventing extreme heat, or in spring and fall in preventing frost, and in dissipating the moisture sometimes supposed to occasion the rotting of the fruit; while in winter we hardly think there can be danger of any kind from the influence of a screen, no matter how dense. The next and best general use to be made of screens should be as windbreaks for the shelter of exposed farms. There can be little need in our climate of screens or windbreaks upon the south or east; and there is, even upon the north, far less need than upon the west; although some of our coldest and most trying winter winds come from the northwest. The great need of protection is, therefore, upon the west; and it is doubtless here that the strongest and tallest windbreaks are required. So much must depend upon the contour of the land that it hardly seems practicable to devise any rule for the location of screens for its protection, beyond the statement that the object should be to prevent the direct impact of strong currents of wind upon the surface.

There remains to be noticed the locating of screens (generally about the residence) for the purpose of shutting out disagreeable or undesirable views, as for instance, the hiding from view of offensive buildings, or the cutting off from the parlor views of the farm yards and stock. For such purpose the finer evergreens only should be employed, and those only allowed to reach the height actually necessary for the purpose.

HOW TO CARE FOR THEM.

The last question I was to answer concerning evergreens was "how to care for them." I could answer shortly by saying, give them the same attention that should be given an orchard tree. Do not dig a little hole in the sod and *stick* the tree into it, expecting soon to see wonderful developments in leaf and branch, but put them in with great care and give them culture. There is nothing like stirring the earth to keep an evergreen growing. It will not do to stop the cultivator as soon as new growth appears, but continue it through the season; not only this, but, to secure the best results, it is wise to cultivate the second and even the third year. Mulching is advocated by many, but I prefer good culture to the best of mulch.

Never shear a tree which you wish to develop into the best form of natural beauty. Too many seem to wish to mend nature by shearing into artificial forms, but the natural habit of the evergreens I have named, when exposed fully to the light, cannot be improved. Plenty of room should be given to the strong growing sorts, and the lower branches should be preserved from injury.

The removal of the lower limbs of an evergreen destroys its beauty for all time. In planting close screens for hedges it is necessary to shear the foliage, but then the cutting should be so managed as to give a natural form to the trees;

The square shearing is too artificial to be beautiful, and is to be avoided.

J. Austin Scott.—I believe in shearing, and think if I could transport the gentlemen here to my place they would see beauty that had been developed in evergreens by the severe use of knife and shears. I do not like white pine as well as Austrian or Scotch. I heartily indorse Mr. Lyon's tribute to the hemlock; it certainly is the most beautiful of the evergreens. I have found the Norway spruce to stand shearing even better than the arbor vitæ.

J. Lannin, South Haven.—I wish to say a word in criticism of the employment of evergreens as a screen to the orchard. The question of whether this is a good practice may turn upon locality. We at the west shore do not want protection from the west winds. They are our safest breezes. As regards the protection to the fruit when nearly grown, I doubt if a screen of evergreens would be of much benefit, especially if we take the advice of the best fruit men and plant on the reliefs of ground. In my own case a screen of this kind would be worse than useless.

Mr. Lyon.—In Mr. Lannin's case he may be correct, since no screen on either the west or the north sides of his orchard could, at least for many years, shelter the trees to any great extent, if planted on the border of the orchard, for the reason that such borders are on lower ground; so that screens must be grown to a very considerable height before they become effective. I know that many men at the lake shore have so much faith in the lake as a protection that they prefer a full exposure to the lake breezes. The two severe winters of the last decade, however, gave at least some of these gentlemen the idea that it may even be possible to have too much of a good thing. Some of them lost peach trees by the hundred, clearly in consequence of full westerly and northerly exposure, with long continued cold. In fact, we have in mind a peach orchard, directly upon the bluff, to which the orchard committee of 1873 awarded a first premium, but which, during the next winter, was killed outright by the severe and long continued cold, with the exception of a few of the trees standing upon the east side, inclined from the lake. A neighboring orchard, similarly situated, but sheltered from lake winds by a belt of trees, came through the same winter uninjured.

George Taylor, Kalamazoo.—I am in favor of screens for protection, and my opinion has been formed from a long experience in this country and in Scotland.

F. M. Holloway, Hillsdale.—It seems to me we should look to this matter of screens for protection to home and stock, not only from a humanitarian standpoint, but as a question of pecuniary interest. I am satisfied that I save twenty-five per cent in feed to my stock in winter because of a screen of white and yellow oak that protects my barn and yard. We want to give stock exercise and recreation, but in order to do this it is not necessary to have it so bleak about the barn that they have to wear half their flesh off to keep warm. A windbreak of oaks on the east and west of my orchard I count as a great benefit in the way that Mr. Lyon suggests. But I do beg to differ with him in the matter of shearing. I would not make the evergreens assume monstrous forms, but I consider the free use of the knife as important in shaping them to produce the most satisfactory effect.

Mr. Healy, South Haven.—I wish to enter my protest against screens in

connection with peach orchards on the lake shore, for I am satisfied it increases the tendency to affliction with the yellows.

Thursday Morning Session.

The session was opened with prayer by Rev. V. L. Lockwood.

The Secretary read a communication from Jacob Ganzhorn, Secretary of the Ann Arbor Pomological Society, on

THE WHITE ANN ARBOR GRAPE.

About twelve years ago Mr. Charles H. Woodruff, of Ann Arbor, engaged himself in the cultivation of the grape. He planted and cultivated carefully all the varieties that were then known and grown by the general public, and has since kept on planting and testing every new, promising grape as soon as introduced. He is known in our city and throughout the county as one of our most intelligent and experienced grape growers, and fully enjoys the confidence of our people.

Mr. Woodruff has had unusual success in the raising of seedling grapes, but he is too modest to come forward and make known to the general public the fruits of his labors in this direction, and I have therefore volunteered to say a few words for him and his seedling grape called White Ann Arbor. I have had occasion to speak of this grape at one of our pomological meetings here, and what I then said is recorded in the State Pomological report for 1878, page 230.

ITS HISTORY.

In the spring of 1870 Mr. Woodruff planted a small lot of Concord seeds. From these a good number came up and made plants. The following spring he removed these seedlings from the nursery bed for the purpose of giving them more room to develop. One of these bore fruit in 1873, which proved to be a white grape and of excellent quality and appearance. The rest of the seedlings, as they came into bearing, proved worthless. Specimen bunches of this white grape were shown at the county fair in the same year (1873) and received a special premium. At the same exhibition were White Nice grapes, grown under glass in the grapery of C. H. Millan, with which Mr. Millan's gardener mixed some bunches of this new white grape in the absence of Mr. Woodruff, and when the latter returned to his exhibit he was asked to pick out his white grape with these White Nice, but both being so near alike he was unable to pick out his own. I mention this to show that the vine has a strong constitution or it could not have borne any good sized clusters in its first bearing, but three years old and transplanted once in this period. The next year the fruit was destroyed by fire. In 1875 it bore again, and was awarded the first premium as the best grape on exhibition, competing with all the popular varieties at that time, including the best of Rogers' hybrids. That year was a trying season for the grape, as many varieties had failed to hold the leaves till the fruit was ripe. I admired the vine of this grape very much in that year, as I saw many of the popular varieties all around this one give way to mildew, but this stood without flinching, and proved an equal match with its parent, the concord. Now, when we consider the rugged constitution of this vine, thereby prepared by nature to resist diseases and severe cold weather in the

winter, bearing white grapes of good, clear fruit of best quality, bunches of handsome appearance and good size, it is worthy of our attention.

Subsequent to the year 1875 Mr. Woodruff removed the original vine to his new home, and although the vine was transplanted, it has borne some fruit every year since. He has now a few hundred vines coming into bearing, and will likely be prepared to exhibit the fruit in the future State fairs and in large quantities. By this means the public will have an opportunity to become acquainted more fully with its merits.

The leaves of the vine do not average large, but are thick and downy underneath, indicating a strong constitution. In appearance the leaves look like its parent, the Concord, and it would require an expert to detect any difference between this and the foliage of that variety. The vine is easily propagated. Two eye cuttings of the smallest well ripened wood make good plants with fair culture. The vine, like its parent, takes hold with a will after transplanting from the nursery bed, and is quickly established into bearing size.

HOW NEW VARIETIES ARE ORIGINATED.

The discussion of the above topic was opened by the reading of a letter from Chas. A. Greene of Clifton, N. Y., addressed to the Secretary:

DEAR SIR:—Pressing duties prevent me from the pleasure of attending your meetings. Casual observations have inclined me to the belief that the impregnation of the blossoms of fruits is not entirely dissimilar to that occurring with animals, and if we follow the analogy we may be warranted in accepting many of the well-tested theories concerning the improvements of sheep, swine, cattle, and horses, as applicable to the breeding of improved strawberries, grapes, apples, pears, etc. We breed stock for color, beauty of form, size, and endurance, as well as for the quality of their productions, crossing certain breeds expecting to attain certain results—why not so with fruits, and not rely on chance, as has been the case so largely in the past? We can trace Negro blood in our own race for generations; we can trace foreign blood (even a slight tincture) in the grape; blood will tell—like produces like. Van Mons held that the effect of the stock on the graft should be avoided in efforts to improve varieties. If your Bartlett pear is grafted on an inferior stock (as it is generally) of course the seed from that tree will be affected somewhat by the inferior stock, and should not be used, but seed from the Bartlett on its own roots instead. That there is truth in this theory is indicated from the fact that the Wager peach reproduces itself from its seed if on its own roots; but when budded on the other roots it will not.

Recent experiments in the northwest indicate that the seeds of the apple produce varieties maturing at the same season as the variety from which they are taken, regardless of the variety with which the cross is made. With grapes, the two varieties selected for crossing are often grown in an isolated location, protected by netting from fertilization by insects, and the vines are permitted to twine together, thus securing certainty of parentage. With the strawberry I should cross a pistilate variety with an hermaphrodite, as the latter might fertilize itself, and could not be relied upon. Our Mr. H. E. Hooker holds that it is not possible to improve varieties of fruits; that if we improve the size or quality, the variety loses correspondingly in other respects, as, for instance, in vigor and hardiness.

CHARLES A. GREEN.

P. S.—It is a noteworthy fact that seeds of fruits produced in a cold climate are apt to produce hardier trees or plants than those of milder localities; also that seedlings are, in other respects, often especially adapted to the sections where they originate.

PROF. W. J. BEAL'S VIEW.

Prof. Beal followed with some remarks upon the same topic, of which the following is an abstract:

To clearly explain this process it is necessary to go a little into the science of botany. What is a variety? Before explaining this we should consider what constitutes species.

Among well known wild plants we have white oak, white ash, blue ash, black ash, sugar maple, red maple, white clover, red clover, red raspberry and black raspberry. Among animals we have the red squirrel, robin, brown thrush, cat bird, bluebird. In each case of the plants named the seeds produce new plants, like or much like the parent plants. The animals named are good examples of species.

Linnaeus said, "A species is a perennial succession of individuals." Maout and Decaisne say that "All individuals which resemble each other as much as they do their parents or their posterity belong to the same species." Gray says, "Species is the type or original of each sort of plant represented in time by a succession of similar individuals."

The characteristics of species are thought to be somewhat firmly fixed; yet, the seedlings from a lot of seeds from one plant or pod are to a greater or less extent unlike each other. If they vary a little, as they often do, each may be considered a variety. If a lot of seeds from one plant are widely separated and planted under different conditions of soil, climate, etc., the young plants will be more likely to vary than they would if planted in the same place where the parent grew.

Some species are much more prone to vary than others. In the nursery row we often see Norway spruces which came from the same lot of seeds look so unlike each other that any one but an expert would be inclined to say they were different species. Some are stout, dark green, with rigid limbs; some are slender with long drooping limbs. Between these extremes we find all gradations. A lot of tulip trees or whitewoods vary but little. Most of the varieties are selected from a lot of seedlings for some striking or interesting peculiarity which they possess. Mr. Wier went through his long rows of silver maple seedlings, and among them was a single tree which had leaves much incised or deeply cut. This he propagates by budding or grafting and names it Wier's cut-leaved maple.

Some of our varieties came from *bud varieties* or *sporting*. In this case, for some reason not known, a single limb or branch of a plant is produced which is unlike any of the rest. Some of our varieties of garden and greenhouse plants originated in this way. Of this kind we have the chameleon coleus. The hoop willow is one of this kind of variety. The hoop willow was a branch of a weeping willow tree on which the leaves each rolled into a ring or hoop, although there was no sign of disease.

The varieties which come from sports are likely to bear branches which wholly or partially revert to the parent stock. Their peculiarities are not well fixed.

All of our varieties in cultivation are multiplied by budding, grafting, layering, suckers, runners, stolons, offsets, and the like. Our varieties of apples,

pears, peaches, quinces, gooseberries, grapes, currants, raspberries, strawberries, are all multiplied by one of the processes named above.

Our Peachblow, Early Rose and all potatoes are multiplied in a similar manner. We plant the tubers which are thick underground stems covered with buds or eyes, which make branches. In the greenhouse we propagate bouvardias by cutting up pieces of the roots which produce buds freely. Varieties of the geranium, coleus, heliotrope, verbenas and rose are propagated by cuttings.

RACES.

If we plant the seed of a variety by itself and continue to select seed from plants of certain styles or types, we shall after a time induce the variety to reproduce itself true from seed. This selection and raising by seed has already been done with our so-called varieties of squashes, cucumbers, melons, seed onions, beets, turnips, cabbages, lettuce, beans, carrots, corn, radishes, tomatoes, and many others. Among plants cultivated for their flowers we have asters, zinnias, and certain colors of phlox Drummondii. In field crops we have wheat, oats, rye, sorghum, etc. In time there is no doubt but what we could multiply Rhode Island Greening trees by seeds as certainly as we now do our squashes and cucumbers. It would take several generations of trees, we do not know how many, to change a variety to a race. We use the term "race" to designate a variety which has become permanent or so fixed that we can raise other plants from the seed. Some peaches have already become, or are fast becoming, races; we can almost multiply them true by seed.

A HYBRID.

This term is quite loosely used by many horticulturists and farmers. If two varieties of one species, are united or crossed we get a variety-hybrid; if two species of one genus are crossed, we get a species-hybrid; if two species of different genera are crossed, we get a genus-hybrid.

Probably the author of the question upon which I am talking wanted to know how to cross or hybridize flowers to produce improved new sorts. On this topic I read a paper which begins on page 51 of the report of our State Pomological Society for 1878. My last two reports printed in volumes of the Michigan Board of Agriculture also contain something upon this matter. Those who want further information on the subject of crossing are referred to these articles. In my papers before the society I am expected to avoid repetitions, yet I often find an old story is better than a new one, because our reports are not numerous enough for all the reading public.

In that article I notice that in this matter of crossing plants lies the richest field for discovery in horticulture.

[Here professor Beal went somewhat into detail explaining the structure and uses of the different parts of the flower of the peach, cherry, apple, strawberry, gooseberry, corn, wheat, melons, and other plants.]

Our students are all taught how to cross and hybridize plants.

What is to guide us in selecting the parents for our crosses in plants? Authors or experimenters are not fully agreed on this point. To make an improvement we usually select two parents which possess good qualities and defects in different directions. To aid in producing variation we sometimes place the seed producing plant under unnatural conditions by extra cultivation, change of soil or climate.

He who wishes to become a successful breeder of plants will do well to

study the principles of stock-breeding. All who have given attention to the subject agree that we have as good a chance to use thought in breeding plants as we have in breeding animals. In many respects the same rules will apply to animals and to plants. To insure good results the breeder or improver of wheat will likely do best to make his experiments on soil and in a climate where wheat thrives well. The same rule applies to attempts to improve potatoes, strawberries, pears, cherries, etc. To experiment with reference to finding iron-clad apples, I should go to Minnesota or northern Iowa. For the best "luck" in originating new potatoes I should look to some cool climate and not to the Southern States.

As we recognize the feeding and care of animals as the leading factor in improving them, so we look to feed, care and climate to help us in improving plants by crossing.

Stock breeders recognize the similarity of rules which apply to breeding or crossing animals and crossing plants.

A year or more ago I published some experiments on crossing plants. The article was copied in the American Live Stock Journal with comments similar to the one I have already made as to the similarity of most of this kind in the animal and plant world.

Pres. Lyon.—Who shall decide between the pistilate and hermaphrodite plants when, as in the Crescent Seedling strawberry, there occasionally seems to be some good anthers?

Prof. Beal.—We find all gradations, from perfect flowers in which both sets of organs are present to those in which there is but one set of organs. I have noted that the strongest growing plants are those which have imperfect flowers.

Pres. Lyon.—Will Prof. Beal explain why the Crescent Seedling is so prolific?

Prof. Beal.—I was not aware that this variety was notably more prolific than some others. The Green Prolific variety produces a great abundance of fruit if planted with another variety which has plenty of stamens. It has been observed that varieties differ in productiveness even if the flowers are perfect. It is pretty hard to account for these peculiarities in many cases.

J. Austin Scott.—Why do we have so many choice varieties of apples, and how do they originate?

Prof. Beal.—Mr. Scott knows that if the seeds of a Northern Spy apple be planted and the trees grown from them, it is a chance if a single tree will bear fruit the same as the parent. Many of these sorts will be worthless, but there may be some excellent ones, which if given extra care will prove to be acquisitions.

J. Lannin.—How can we breed a variety to suit certain conditions? For instance, it would be a great thing to have a good peach to follow immediately after Hale's. How shall we get it?

Prof. Beal.—I should take an earlier, distinct, well-marked variety and cross with a later one, and plant the pits.

J. S. Woodward, Lockport.—Will the professor tell us if in his opinion in such a cross as he mentions, the quality of the new sort would take after the variety from which the pollen was used?

Prof. Beal.—In this, as a good many other things, the "doctors disagree." There are instances where men have experimented with a great many plants and reached opposite conclusions. As yet no law has been found which seems to govern this matter.

Mr. Baldwin.—It seems to me if I were going to experiment in crossing I would take varieties which will reproduce themselves from the pit. It occurs

to me that these sorts would have their characters more indelibly stamped. In other words, I would breed from "thorough-breds."

Prof. Beal.—I think the gentleman is correct in this. Mr. Hathaway in Cass county has a kind of corn which has been grown for a long time on his farm, and by selection he has secured a corn that is good to breed from. I have been using it for this purpose.

Question.—Do you think there is any way out of the yellows difficulty in peaches through the breeding of a more healthy kind of peaches.

Prof. Beal.—I believe the most promising way out of this scourge is through the growing of seedlings and selection therefrom.

This discussion was cut short to give place to the topic,

HOW TO GROW APPLES FOR PROFIT.

by J. Webster Childs of Ypsilanti.

We think the time has arrived when no one, in Michigan, at least, need fail to make a handsome profit in raising apples for the market. So much information upon this department of farm production has within the past few years been disseminated, both through the press, which has gathered up and given to the reading public the views of our most experienced as well as our most scientific pomologists, and also by the exhibitions of fruit at our county, district and state fairs, where the results of skill and good culture are so beautifully displayed, encouraging effort and exciting emulation in the beholder, and more especially through the very able and practical discussions of our local and State Pomological Societies and their published reports, that even the inexperienced need make no very great mistakes, either in the selection of varieties or in the manner of cultivating them.

In growing an orchard for profit simply, the first thing to be considered is, what and how many varieties to plant.

The answer to the first question will depend somewhat upon the soil and the locality, as some of our most approved and popular varieties seem to be better adapted to some kinds of soil, and to flourish better in certain localities than in others. Valuable information upon this point may be readily obtained from the best fruit-growers in the vicinity where it is proposed to plant an orchard. From a list of perhaps a dozen of the very best market varieties we would then select not to exceed four or five, having reference in the selection to the natural characteristics of the tree for vigorous growth, hardiness, and prolific bearing, and to the popularity of the apples in the market in which they would be the most likely to be offered for sale. Planting those of the same variety in contiguous rows will not only add much to the symmetry and beauty of the orchard (as they can be easily trained to look very much alike), but will also add somewhat to the convenience of gathering and preparing for market.

For the first ten years, at least, after planting, as vigorous and rapid growth should be obtained as will be consistent with the health of the tree. In order to accomplish this, none but the most perfect and healthy trees are desirable for planting.

The ground where it is proposed to plant an orchard should, in all cases, be heavily manured from the barnyard, and plowed as deeply as possible for a year or two before setting the trees; and also under-drained, if necessary.

The spring is, I think, the preferable time for setting the trees, and I would put them not less than thirty-six feet apart each way, except Wageners, which

if I set at all, I would put in an orchard entirely by themselves, on account of their early and very prolific bearing, and small size of top, and I would set them not more than twenty or twenty-four feet apart.

In setting trees it is labor well expended, and will pay, to dig the holes at least three feet across and a foot and one half deep; then fill nearly to the surface with top soil, as in no case would I plant the tree much, if any, deeper than it stood in the nursery. The holes being thus dug and filled, together with the fact of the land having been manured and plowed very deeply previously, will result in the lateral roots striking lower than they otherwise would, thus being more out of the way of after cultivation.

On account of the great prevalence of west and southwest winds in this State, great loss is sustained from many of the trees getting to lean to the east and northeast, and becoming dead upon the west or southwest side,—a result almost sure to follow through the effect, I think, of the rays of the sun striking perpendicularly upon the side of the tree thus exposed when the wood is frozen. This may all be easily avoided by staking the tree for the first few years, driving the stake upon the southwest side, and confining the tree to it.

After an orchard is thus set, I would manure it from the barnyard every second or third year, and cultivate it with some hoed crop rowed both ways, so that the ground can be very thoroughly and often cultivated, which I consider far preferable to mulching and no cultivation. By continuing this cultivation during the first half of summer, a vigorous growth of the trees will be secured in the early part of the season, and by not stirring the ground in the last half of summer the new wood will have a better opportunity to ripen up for winter.

In an orchard of originally healthy trees, thus carefully set, very few will be lost by the transplanting, and thus cared for few will fail to come to maturity, unless destroyed by accident.

A very important matter connected with making orcharding profitable is the pruning; and while it is true, as a general rule, that the skillful orchardist may give his trees about such shape as he pleases, still the pruning should be done with a thorough knowledge of the natural characteristics of growth of different varieties of trees. For instance, no well posted fruit grower should, or will attempt to give a like shaped top to a Northern Spy and a Rhode Island Greening. The pruning should never be done in a "hap-hazard" way, but with an intelligent idea of what form of tree is desirable, and the reasons for the same. The extremes of too compact or too open a top should be carefully avoided. With all varieties the skillful pruner will be able to secure a handsome, well-rounded top, sufficiently compact to give the proper shade to both trunk and main limbs, and at the same time sufficiently open to admit the amount of light and air necessary to perfect the fruit of the more central portions of the tree. The pruning should be commenced when the trees are set out, and continued regularly every year as long as the orchard lasts.

At the time of transplanting, as the tree has lost so many of its roots, the top should be cut back, and some of the branches should be entirely removed, if it has too many, leaving such as will start a top in the desired form; and then, by careful pruning every year, it will be a long time before anything except the pruning knife will have to be used; and rarely will it become necessary to cut off a limb more than an inch in diameter until the tree becomes old, and begins to lose some of its limbs by decay. I think it is very desirable to avoid cutting large limbs from the trees as long as possible. Judicious

pruning year by year—cutting out small branches where the same are too thick and keeping the bodies and main limbs free from sprouts—has much to do with the production of a greater proportion of perfect fruit, large in size and fine in quality.

From my own experience, as well as observation, I am of the opinion that the profits of the orchard are augmented by heading the trees low. On such varieties as the Rhode Island Greening and some others whose branches incline to a more lateral growth, thus giving a very spreading top, I would start the top about four feet from the ground, while to the Northern Spy and such varieties as naturally make a more upright growth, I would endeavor to give not over three feet of trunk. Trees with their tops formed thus low will be more easily kept erect, will have less of their fruit shaken off by the wind, and the expense of gathering will be quite a per cent less than from those allowed to grow much taller.

As to the best time in the year to trim an orchard much has been said and written, and considerable difference of opinion and practice prevails. And while I believe the *time* of trimming of less importance than the *manner*, still I think that it can be most successfully and properly done when the trees are free both from fruit and leaves, and that all things considered, perhaps no time is better adapted to this important work than the month of March and the first part of April.

Shall we plow and cultivate our orchards, is a question of much importance; and in reply I would say, "Yes; but it should be done with the utmost care." I think that not only young trees are far less likely to suffer and have their growth retarded by drouth where the land is planted to a hoed crop and often stirred with a cultivator than where it is in grass or a sowed crop, but that also, as the trees come into bearing, we get finer fruit and more of it from an orchard that is well fertilized and thoroughly cultivated. But as the trees advance in size and the roots become extended, the plowing should be very shallow, and at no time should it be deeply plowed near the trees.

I have an orchard that has been set twenty-two years, with which I have been very successful, and which has borne a large amount of very fine fruit, which I have plowed and cropped nearly every year, and most of the trees are still in fine thrifty condition, making a good growth every year, and but few have died out. As the trees have now become very large, and being headed pretty low, it is very inconvenient to plow it, I have therefore seeded it to grass, and fertilize by spreading a liberal coating of coarse manure upon the surface, which I consider the next best way of keeping up the production of fine fruit, and a large amount of it.

Ashes, either unleached or leached, are of great value to the orchard, and there is little danger of using too many,—spread broadcast over the ground.

While it is evident that by very heavy and constant manuring it is *possible* to stimulate a too rapid growth of the orchard, resulting probably in its being shorter lived, still my observation has led me to conclude that where there is one thus injured, there are scores in which more manuring and better care would add largely to the profit to be derived from them.

No intelligent farmer would expect to get a remunerative crop of grain of any one given kind from the same piece of ground for twenty or twenty-five years in succession, without a constant effort to keep up the fertility of the soil; and even with such effort a rotation of crops is the far wiser course to pursue. But with the orchard there is no chance for rotation. When the

trees are once planted, it is for a generation, and year after year the same draft is made upon the soil, only increasing as the trees grow larger, until every square foot of the soil is filled with a net-work of roots; hence the greater necessity that there should be regularly returned to the soil such fertilizers as will best meet and supply the draft made upon it.

After an orchard has become so large that it is inconvenient to plow it, and it is seeded down, I think it is better for the trees and more profitable to feed off what grass grows upon it than to mow it, and I know of no better way than to pasture with hogs and calves, until the windfalls begin to be of value answering the double purpose of saving what grass there may be, and also destroying to some extent the codling moth.

The fall growth of grass may perhaps be profitably left as a protection to the roots of the trees against freezing in the winter.

The profit to be derived from the sale of a crop of apples well grown depends very much upon the manner and care with which they are gathered and prepared for the market. I have found a bag hung upon the left shoulder as convenient as any thing to pick into, and after picking those that can be reached from the ground, gather the others by means of light ladders of different lengths made broad at the bottom and very narrow at the top. Carefully empty the apples into baskets and from thence sort into barrels, putting in only those of first quality, leaving the inferior ones in piles under the trees, to be afterwards gathered up, again sorted, and the best of them, together with the most perfect of the dropped apples, barrelled up and marked and disposed of as second quality fruit.

In this way the reputation of our apples can, not only be maintained, but steadily increased, and the highest price obtained for our fruit, and much more profit made than by mixing a few not strictly prime apples in each barrel of first quality ones.

At what time in the fall will it be most profitable to gather our winter fruit, is a question that will depend upon circumstances that we can neither foresee nor control. If we pick in the last part of September and the month of October is as warm as it was this last season, we may find it difficult to dispose of our apples early (if we desire to do so) at a remunerative price; and if we keep them for a late market, we may lose from decay, unless very great care is taken to prevent it. On the other hand, if we delay gathering them, waiting for the warm weather to pass by, until the middle or last of October, a sudden change of weather and heavy frosts may very materially injure the keeping quality of the fruit; and severe winds may shake off large quantities of it, rendering the same comparatively worthless.

It is generally conceded that winter apples gathered as early as the middle of September in this latitude are less liable to decay than those that remain upon the trees a month later. At the same time they may lack something of the fine flavor that those will possess that are more perfectly matured by remaining longer upon the tree. On the whole, as a matter of profit, I believe it best to commence gathering winter market apples as early as the 20th of September, finishing such gathering if possible by the 1st of October.

If the early market is good and it is desired to sell at once they should be carefully packed, the bottom head nicely set with two courses of *average* apples placed with the stems down. As the barrel is being filled it should be several times lightly shaken so that the apples may lay as compact as possible, and when so filled the head should be *very firmly* pressed in so as to prevent any

shaking of the apples while being carried to market, head-lined and marked with the name of the variety and also with the name of the grower before leaving the orchard. I think the general reputation of Michigan apples for keeping has suffered very materially from the fact that so large a portion of them are drawn to market loose in lumber wagons over our rough roads, which cannot be done without more or less injury to the fruit. It would be far better if all our winter market apples could be packed in the orchard.

If for any reason it is desired to keep them for a late fall market, or over winter, pack them as before except that the barrel should not be filled so full as to need much if any pressure to put in the head. When headed up, and without head-lining the end that has been opened, mark with the name of the variety and place the barrels so filled at once under the trees or in some shed or barn where they will be entirely out of the way of the sun, leaving them there, if it is proposed to keep them for spring market, as late as they can safely remain without freezing. When taken to the cellar they should still be kept in as low a temperature as possible without danger of frost. If sold late in the fall, being thus headed up they can be easily examined, and if for any cause they are found to have decayed to any extent they should be repacked. If not needing repacking, a few more apples may be put into each barrel, the head properly pressed in and head-lined and they are ready for market.

I have thus given what appears to me, judging from what experience I have had in the matter, one of the good ways (not supposing it to be the only one) of raising and handling apples for profit.

In closing I would say that only those who take pleasure in planting and caring for an orchard would I advise to engage in the business of raising apples for the market, for only such will be likely to make it profitable.

The question of the proper time to trim the apple orchard having been brought up, Mr. Scott said that he thought the best time to trim late in the season, as then the water sprouts were less likely to grow. He also thought it advisable to put rails or scantling on the ground when the apples were picked and headed up in the barrels and then turn the barrels down on the side on them, thus giving a free circulation of air all around the barrel.

Prof. A. J. Cook, of the Agricultural College, occupied the next half hour with an account of some of the most approved methods of

INSECT WARFARE.

The address was given in connection with blackboard drawings and an abstract must necessarily convey a very imperfect idea of its details.

He believed in fighting most of the insect enemies of the orchard the one thing most needed was concert of action. Insects are migratory, and if battled in one field will seek a more peaceful domain in which to prosecute their work of devastation; and they are so very prolific that even although their field may be quite restricted they will develop in such quantities as to make a great deal of trouble to every one.

Prof. Cook here described the codling moth, its history and habits, illustrating with crayon the different stages of growth, and by band, tacks and hammer the most approved method of catching the larvæ, all of which has appeared in previous volumes of our transactions.

He said by concert of action in a neighborhood the expense of fighting the moth would be very much lessened, as a bright boy could care for a number of orchards, and if the neighborhood was somewhat isolated the beneficial results

would be very noticeable at once. He recommended that the State Pomological Society stimulate exertion in this direction by offering a prize to the locality which would do the most efficient concerted work of this kind. The work should be vouched for in such a way that no mistake would be made in the award, and he had no doubt but the result would be very satisfactory to the society, and each neighborhood competing would receive a great deal of benefit even if the prize was not secured.

Prof. Cook next said it was quite important that we understand how nature was helping us in our insect warfare, and explained the work of parasites upon potato beetles, Hessian fly, canker worm, and even upon bark lice. He next reviewed the history of the canker worm in Michigan, illustrating upon the blackboard the difference between male and female, and described the two most approved methods of warfare, to wit: the sticky bands and the use of a poison in solution. He thought the latter method the best for us to employ. He would use London purple in solution, and apply with a force pump. He had used Whitman's fountain pump with good success.

The question was asked if this plan of fighting insects with liquid poison was successful with other insects also. Prof. Cook said he had employed it very successfully with leaf-rollers, and on the lake shore they had fought rose chafers with it.

J. S. Woodward of Lockport, N. Y., said that he would use Paris green to destroy the codling moth, as that was the cheapest way, and quite as effective.

Prof. Cook said that was new to him, but he saw no objection to it. He thought, however, that there would have to be several applications during the season. Mr. Woodward replied that one application was sufficient in all ordinary cases, and said that he would apply it when the fruit was just formed.

The next subject considered was,

FERTILIZERS FOR THE ORCHARD AND FARM.

Col. F. M. Holloway opened the subject with a paper as follows:

I have been requested to prepare a paper on fertilizers,—as stated in our programme,—what best for the orchard and what best for the farm.

The question as put implies discrimination in the use of fertilizers as between the orchard and the farm, or in other words what would be good for one, bringing the best results, would be hardly an appreciable quantity or quality for the other. In this light we propose to treat this double subject, before this double audience, made up of fruit-growers and crop-producers, and with many combining the two together.

We will, with your permission, consider the wants of the orchard first. And by it we include the different fruit-bearing trees that are adapted to our soil and climate, and which have been in the past or are now more or less cultivated. In the early raising of fruit in the State we could hardly introduce the young stock to the soil before it would spring forth with a vigor unprecedented to us who had been cultivators in the eastern States, and before we were prepared to look for it our baskets and cellars were filled with the most beautiful, the most luscious fruits, God's best gift to man; and there is no doubt as to many of Michigan's sons being ready in the past to justify our great first ancestors in partaking of the fruit, reasoning *a priori* that it was the first growth of a new country.

Change is written in indellible lines over the broad expanse of earth. Animate and inanimate, mineral and vegetable, all pass the ordeal alike; and the

careful observer will note the rapidity of this change. The philologist and scientist will study the forces at work, and give you the reasons therefor. The skilled physician will carefully diagnose his case before he prescribes for the same. In like manner should the careful horticulturist understand all the wants of tree life before he may deal wisely with the tree itself. Close observation, careful watching, will be important factors in guiding him to action.

The mysteries of plant growth, the knowledge of the combined forces that propel it, have been (I am sorry to say it) a sealed book to a majority of the farmers of our land. They plant and sow regardless of surroundings. Harvest or no harvest, it is the hand of Providence that has done it. If there is a truth on God's footstool that needs to be inscribed upon the door posts of every tiller of the soil, proclaimed from the house tops the whole length and breadth of the land, it is the one that asserts the importance and necessity of skilled, scientific labor in cultivation. The rules of trade, the law of supply and demand, our individual identity, all demand of us thought; demand of us to produce more, to produce better, and to produce cheaper than ever before.

With these preliminaries let us consider our interests in horticulture, for we are all more or less engaged in it or some of its branches. The apple orchard first demands our attention; are our trees as vigorous and healthy as we would desire, as when we first planted them out, as in their early years of cultivation; if any is so favored, he is one of the few who through a train of circumstances have been favored above the mass. We may assert without successful contradiction that a majority of the apple orchards in this part of the State are not what they should be; either in health, which means thriftiness, or in profit, which means fruit.

What are their wants to restore them to these two essential conditions. To determine clearly this important question will call for knowledge that but few of the farmers of our land are in possession of.

We of course have reference to botany or vegetable physiology, by which we may know the forces which act upon matter in the inception and formation of the tree, the relation that one member bears to the other to make a perfect whole, and the wants of that whole to perpetuate life and profit. We need also to be well versed in agricultural chemistry, that we may the better understand the principle of assisting nature in restoring the wasted or absorbed elements of plant growth.

I have many times wondered why it was that so many of the farmers of the State have shown such marked hostility to our Agricultural College, instituted for the benefit of their sons, endowed free of cost to them,—the only institution within reach where these sons could be educated, combining both theory and practice in all of the vocations of a farmer's calling. I am glad to know that these prejudices are dying out, and that this country is measurably free from them.

It has been an old saying that soil counted good wheat land is fully adapted to the apple. This may be true in part and in part not true. Much depends on the sub-stratum. The one plant is an annual, the other a centennarian or more. The one feeds from the surface mostly, the other digs deep, and with outstretched arms cries give. Both want light and heat with sufficient and suitable nutriment. The grasping powers of the one are very contracted; its food must be brought nearly in contact with it, while the other in its long reaches stands exposed to a lingering, slow death from many causes, often too much water or hydrogen. Its roots are poisoned; they no longer perform their proper functions in reach for new substances on which to feed. Gradually but

surely this poison ascends to the lungs—the leaves—and from these to the bark, and by this returned to the root to be again impregnated. With its channels thus impeded is it any wonder that it casts its fruit, that its leaves grow yellow, wither and fall. In all such cases, and they are numerous, there is but one fertilizer that will be efficient; that one is under-draining, deep and efficient. Give those roots a chance to go as they please dry shod, sweeten up the soil with a good coat of lime now and then until the wood and bark assume their wonted vigor.

It is a fact patent to every scientific horticulturist and pomologist that many, very many, of the orchards in the State are losing their pristine vigor and dwindling away from other causes than drowning, some by sheer neglect or vile treatment, but a large proportion from want of proper food. When we go back and view the shrub in its native jungle, shaded from the parching suns of summer and the bleakness of an arctic winter, and compare that protection with what it gets in our latitude after undergoing the transforming process from the native crab to what it now is, is it any wonder that its susceptibilities have been increased. That it demands the best of care at our hands if we expect to make it a source of profit. Does it get it? How are the majority of orchards treated from year to year? In most cases it is plow and crop; sometimes pasture, sometimes fertilize, with little regard to the quality of soil and less for the kind of manure used.

To treat an orchard successfully for growth and profit, commercial fertilizers are out of the question. They would cost too much money for the doubtful value there is in them, and were they as good as claimed their nature would be too stimulating and short-lived. You would see its effect in the tree but not in the fruit.

To those who believe their orchards would be ruined did they not plow them every year we would recommend cropping with peas in preference to any other grain, using liberally of plaster, two or three hundred pounds to the acre, sowed before the seed is drilled in, and in addition thereto, if obtainable, a good dressing of ashes (unleached much preferable), not omitting the lye wash as often as once a year, and be sure to let the hogs do the harvesting. Continue this treatment a few years and you will find a new vigor to the tree, a brilliant complexion to the fruit, and in size and quality you will not be disappointed provided you keep all other crops off the ground.

Another and a very successful way of fertilizing an orchard for apples is, as soon as the trees become well established and begin to bear fruit to seed down the land and mulch the trees, not by piling a little coarse stuff around the trunk, but by covering the ground substantially as far as the limbs extend so thickly that but little grass will grow. As soon as this is rotted renew the mulch, pasture with hogs or sheep, the former preferable if secured against rooting. We consider this the preferable way to treat the orchard, giving it yearly the indispensable dressing of ashes or the lye wash.

Treated in this way we have no complaint from the owners that their Baldwins are tinctured with bitter rot, their Spys scabby or specked, their Bellflowers and Swaars knotty and one-sided. Indeed, this method comes nearer to the native habit of the trees than any other. It gives no forced stimulation to the root by extra heat from a summer's sun, but keeps the soil moist, permeable and sufficiently cool at all times, and adds value as a protection against frosts in winter. One of the best orchards in this county for vigor of tree, firmness of fruit and profit to the owner has been treated in this way for twenty-five years. It makes a place for your ashes at forty cents a bushel that you

now sell to the soap-maker at eight cents. It makes a place for your straw-stacks and corn-butts that you so frequently burn up to get them out of the way, and it will make a place for those luxuriant crops of rag-weed which frequently spring up in pastures and on stubble-fields—provided you cut it before it goes to seed.

To one so disposed, abundant and cheap material may be found on the farm for this purpose without breaking in upon the more valuable contents of the barnyard.

THE PEAR ORCHARD.

From all we have read and our observations for the last twenty-five years, we would treat it very much like the apple orchard in sod; we would be careful to add every year, if possible, a good dressing under the tree of iron filings or sweepings from around the blacksmith's anvil, or the iron finisher's bench, the tendency of which is to thicken the sap, harden the wood, and give strength to the fibre of the bark. Of

THE PEACH ORCHARD,

we hardly dare speak. Observation confirms our belief that it needs thorough cultivation, and if planted closely, it is crop enough of itself for the land it covers. That it is a heavy feeder upon the soil, there is no question; neither is there any question as to much greater climatic influences upon it, than on more hardy fruits; therefore great caution should be used in fertilizers. In my judgment ashes, thoroughly rotted manure, iron pyrites, spent tan-bark, and light dressings of salt are the best,—such as will give strength to the sap and firmness to the wood without forcing an extra growth. For the

QUINCE

a well-drained subsoil with a heavy mulch of chip manure and plenty of salt. Of the numerous

SMALL FRUITS,

we may say that each has its peculiarity,—each needs special treatment, and the observing cultivator soon learns how to help his soil if necessary to bring the best results. Oftener than otherwise he will find mulch profitable. The orchard is, in short, a field for much study. Soils vary; each variation forming the foundation, suggests a different treatment. Horticulture is coeval with the creation. The ancients had their courts of Pomona, and discussed the best methods of raising fruit. These have not been handed down to us, therefore we must be content with the light and knowledge gained by experience.

We come now to consider the best fertilizers for the farm. In doing so, we shall be brief, as we have heretofore in different ways, given our views on this important subject; and allow us to include in the term best, any and every thing convertible into a fertilizer that is produced on the farm, for it cannot be supposed by any one conversant with cropping in Michigan and the small profits derived therefrom that anybody in the business would be so hasty for big crops as to at once resort to guano, or invest largely in the phosphates or superphosphates at the prices asked for them. We will then consider the question amended, and to run in this form: How shall we increase the fertility of our farms from the resources of the same? Submit this question to twenty of the best farmers in this audience, and I have no doubt but what we would have twenty different answers.

It is this Yankee method of asking questions and eliciting answers that

keeps us on the highway of progress, and where one makes a failure by clinging to preconceived notions or theories, a dozen perhaps will make a success of the same thing by having that failure as a warning for them to shun.

One man would graze and feed exclusively, relying on this as a sure means—a very good one provided he has land as natural for this purpose as the blue grass regions of Kentucky. I apprehend such are scarce in Michigan. Another would cover his farm with sheep, believing the constant tread and the richness of their droppings will certainly produce the desired fertility. To my mind no greater mistake could be made. Their noses are so small that they drop into every little crack; their bite so close as to take the crown from every bulb of grass in the field before you are aware of it. This is death to every plant that does not perpetuate itself from the joints in the root like our June grass. And as to their droppings, highly concentrated as they are with ammonia, their best value soon passes in thin air unless put under ground.

Another would raise corn and clover and rely on swine to do the work—a very slow process. A man would want to begin young and live to be old before he would get a farm, large or small, very fertile. The reason for this lies in the fact that his swine want the adaptability of converting the whole product into fertilizers. They are masters of the corn grain and some green clover when it has but little fertilizing power in it.

Others would discard all stock and rely on wheat and clover to do the work. Here, too, we apprehend, is a mistake. While the two work well together they are both subject to failure. If one fails and the other stands you have a break in the succession which will discomfit your plans and render a part of your work lost, and the system is so costly in labor few will adopt it if they can find a better.

A better and more successful practice is to combine these several plans in one, making what we call mixed farming, with a regular system of rotation and thorough cultivation, with this one thought predominating, how much manure may I manufacture this year.

To carry out this thought successfully many things must be taken into consideration. The barnyard and stables should be so constructed that nothing can run to waste. The supply of material should be the entire vegetable growth of the farm, and additional if it can be obtained without robbing your neighbor. The stock should be chosen for their ability to manufacture the materials you have to work up, probably a percentage of each kind. You must have cattle to handle the coarse, bulky material on hand. Your coarse grains naturally go with it, and all should pass first to the stable, then to the yard, and there met by the swine, who will take it in hand, turn it and return it, mix it and manipulate it so as to make it fit for use for your corn and oat crop. While your animals are thus working to further your purposes you will have an eye open to the gathering of the ashes and garbage from the city or village, worth to you double their cost if not too distant to haul them. Perhaps your soil is porous and the surface uneven and you find the minute particles of decayed fibre run into a depression of the surface, forming a swamp or marsh, making it a waste because of its adaptability to hold water. Seek an outlet for the water and use diligence in removing these washed and made particles back to their proper place. And last, not least, be liberal in the use of plaster, lime and salt. These are all cheap and their value in production is beyond question. Plaster for the barnyard to hold the ammonia and prevent fire fang or burning; plaster for your clover, corn, oats, barley and peas, put broadcast on the soil as soon as plowed, then worked in by further fitting

or in drilling; plaster for your pastures, if dry land, and plaster for your wheat, drilled in with the seed, if the soil is light or has been overcropped.

Lime on your low lands where vegetable muck abounds, if not overcharged with water. If wet and springy you can only help them by thorough draining. Lime on all sandy lands that show evidences of leaching.

Salt on wheat and timothy, meadows or pasture, anywhere from one to two barrels per acre. Besides being a worm destroyer it acts directly on the root of the plant, giving tone and increased vigor, which is carried to the stalk and seed, making a heavier grain and an increase in quality and quantity.

It being time for recess, the discussion on fertilizers was postponed to be taken up later in the meeting.

Thursday Afternoon Session.

The exercises of the afternoon were opened by two excellent essays, the one by Mrs. Thomas Hutchins, on "the problem of life and how to solve it;" the second by Miss Emily Benedict of Litchfield on "the hand, the head, and the heart." Both of the papers were listened to with a great deal of interest by the audience and added more than their share to the success of the meeting. We regret that the topics touched upon were not such as to come within the scope of a horticultural report.

Mr. J. S. Woodward of Lockport, N. Y., delegate from the Western New York Horticultural Society, next answered in the following paper the question

HOW CAN A SUPPLY OF GRAPES FOR A FARMER'S HOME BE CHEAPLY AND SUCCESSFULLY GROWN?

Nestled among the earliest recollections of my childhood, is the memory of a picture. Two strong men were bearing a staff on their shoulders, from which depended a magnificent cluster of grapes. My mouth often watered as I gazed on the picture, but I somehow got the impression that only in the promised land of the blessed should we be allowed to taste such delicious fruit, and it was with much pleasure in maturer years I learned how easily it could be grown, —if not in such monstrous clusters, at least in equal goodness, as pictured by the fancy of my childhood.

That your farmers have not each already a full supply, is to be explained only that while they gaze on the beautiful fruit at the fairs or in the market, and long for it, they, like the Israelites of old, lack the courage, and would rather go back to the flesh-pots than put forth the little exertion necessary to possess it. They have not yet come to realize what is their due as cultivators of the soil and commissaries of mankind; nor are they yet aware of the enormous loads of refreshing fruit the grape will give in payment for the little care and labor demanded, or the value of this fruit to them and their families.

If in my attempt to answer the important question, I shall arouse their attention and cause them to investigate, my desire will be gratified.

To secure the desirable supply, certain conditions must be observed, and though few and simple, like all of nature's rules, they *must* be heeded if we would win success.

You would not expect to gather a crop of corn, or wheat, or any other produce, where you had not prepared the soil with great labor, and tended the growing crop carefully and well, amid the heat of midday as well as the early and the later dews. You would not expect a lamb, calf or colt to grow into a

valuable animal unless you take the pains to nurture and care for it three hundred and sixty-five days in each year; neither must you expect to "gather grapes of thorns," or to fully enjoy this great blessing unless you are willing to give the little care and attention necessary.

The importance of the subject might justify me in pausing here to dilate upon the medicinal qualities of the grape and its great value as a restorative food; but I shall take it for granted that all are awake to these important points, and I shall only endeavor to answer the question "how a supply can be cheaply and successfully obtained."

To tell how a farmer can secure a full supply is to tell how a grape grower can obtain the best results in a vineyard, for what is good treatment for a single vine is good treatment for a hundred or thousand. To set a few vines and let them run wild will only end in disappointment; so if my instructions smack of the professional, remember that "what is worth doing at all is worth doing well." In all our operations as fruit growers we should "drink deep, or touch not the Pierian spring;" but much of the attention needed to secure the best results can be given by the wife or daughters, and be both healthful and pleasant.

In answering the question let us consider the necessary conditions under the following heads: soil, situation, culture, training, varieties.

SOIL.

That your beautiful State, resting in the bosom of the great lakes, has a soil and climate congenial to the growth of the grape, needs no other proof than the tangled masses of wild vines that line the banks of her rivers and run rampant over the tops of the trees. In selecting a location on the farm of course there is a choice. The grape, to show the best results, should have a soil with more or less clay; but they do fairly well on almost any soil, *if it is dry*. Remember the grape is nearly as sensitive as the peach to having *wet feet*. Unless your soil is naturally dry, see to it that it is made so by a few deep surface ditches, or what is better, underdrains put deep. Vines will do well for a few years and then gradually fail. In all such cases you will find their roots have reached so deep into the soil as to be permanently wet, and there is no remedy but to drain still deeper. A little surface moisture in the winter or spring, or a good deal even, does them no harm providing it soon runs off and the subsoil is porous and dry. Select a piece of dry, moderately rich, *clayey, gravelly or sandy* soil, preferable in the order named.

SITUATION.

In selecting a site for your vineyard remember the grape is a child of the sunshine. You could no more expect it to do well and be healthy, bearing full crops of its best fruit in the best condition deprived of the sunshine than to expect the cheeks of your daughters to be rosy, their steps elastic, and they to be merry, bubbling over with life and spirits, deprived of the same genial influence. A few vines placed on the south, east or west sides of your buildings will give a good report of themselves; but for the main supply better place them where the vines shall have full exposure to sun and wind. Place the rows north and south if possible so the sun shall have full effect on both sides the vines and also on the ground, as nothing so quickly destroys fungus and disease in plants or men as sunshine.

CULTURE.

The grape does not demand any extra treatment. As I have said before, be

sure the soil is naturally dry or made so; and if not as rich as good corn land, make it so by applying well-rotted manure from the stables, and also some fine bones and plenty of wood ashes. Set the plants an inch or two lower than they grew in the nursery, on a deeply plowed or worked plat. Give good corn or potato culture the first two or three years, keeping the ground entirely free from weeds, so as to get a strong growth, suitable for full fruiting. After this, and when the vines are in bearing, I should advise cultivating the soil well until the middle of August each year. From that time out let the ground alone, cutting any weeds that may grow with scythe or grass hook. This tends to ripen the fruit earlier, and also prevents that late succulent growth of wood that causes the vines to be so sensitive to the severe cold of winter. Late in the fall when the leaves have mostly fallen, plow lightly towards the vines, to cover and hold the leaves and to bury and kill any insect that may have taken quarters among them.

TRAINING.

Here we come upon disputed ground, especially in your State, some advocating stakes, some low trellises and close planting, some setting as much as fifty feet apart, and some very high trellises. But while we know the grape will adapt itself to almost any system of training and give very good results, I should recommend for Concord, Hartford, Moore's Early, Niagara, or any of the strong growers, setting in rows north and south ten feet apart, with vines twelve feet apart in the rows, the second year erecting a trellis that can be made six feet high, with the lower wire not far from two feet above the ground. The first year, put a lath or other light support close by the vine, and train to a single stem, pinching all laterals at one leaf from the vine. Cut this back in fall, if of good growth, to eighteen inches, and by all means lay it down, and cover with a mound of earth, as well to prevent too hard freezing of the young and tender roots as of the wood.

Right here we must decide on some system of training. Although there are as many almost as grape growers, I shall describe but one, and that the one which will require the least time to learn and the least labor to carry out in practice; the one which the women of the household can easily execute, and which will give the maximum of fruit with the minimum of labor.

Second spring, put two wires on trellis; let two eyes start from the top of the cane; train one each way, pinching laterals to a single leaf each. Some now become impatient, and want a full crop of fruit the third year, which would be very apt to permanently enfeeble the plant. The better way is to have patience, and prune each cane to only three eyes. The object each time in letting three eyes remain when we want only two canes to grow, is to insure having the two canes.

Third spring, let only two canes grow from each arm or spur. Train one to the lower wire, and let the other take the second. Now you need not pinch laterals, unless some one is disposed to run rampant, in which case head it off. If the plant is a strong one, you may let each of the four canes growing the third year bear one, two, or three clusters, which will be all the fruit prudent to attempt this year. Your vine now should be strong enough to bear a fair crop, and we must prune with reference to that. Cut back the cane growing on upper wire to three eyes again; but leave the lower cane four feet long for fruiting.

The spring of fourth year, fill the trellis with wires; tie the long cane to

lower wire, training the shoots that grow from it perpendicularly, tying to upper wires, and heading off just above the top wire. Don't let the laterals grow more than two leaves. Let the two canes that grow from the spur run along the upper wires of the trellis.

In the fall of the fourth year cut the bearing vine entirely out, back to the arm from whence it grew; cut the best cane from the spur five feet long for bearing cane next season, and cut the other back for a spur to produce wood for the sixth year. Thus go on each year, cutting out the bearing vine of that year and bending down in its place the best one grown from the spur the previous year, and cutting the other to form a spur again for the next.

In the spring of each year tie the bearing cane to lower wire, and rub out all shoots that do not show fruit buds. You may also let each shoot or cane grown from the spurs bear fruit each year. To those who have never grown grapes, this may seem a good deal of labor, but when you come to know just how to do it, you will find it but very little trouble, and the fruit produced will be fine and abundant, and you will never regret it; and remember this is part of the price that nature requires us to pay for good fruit.

This is only one of the many systems of training, but it is the one now mostly followed at Vine Valley in our State, and which seems to require the least skill and patience. And I have always noticed, among those growing for home use, the best success where they most closely follow this system; but whatever system you adopt, be sure you do not let them overbear or grow so rampant as to become only a mass of tangled unproductive canes. Remember one good healthy leaf is worth a dozen half grown. To produce the best results in fruit, we must have the fullest development of healthy leaves.

VARIETIES.

The farmer don't need to care whether a vine belongs to the *Labrusca*, the *Cordifolia*, the *Vinifera*, or any other family, so long as it gives him a bountiful supply of good fruit for his family's use. He would also prefer a bushel of fairly good fruit to a few clusters of exquisitely flavored exotics that can only be grown in very limited quantities by the greatest care and patience. He has the mouths of the youngsters to fill, and when once they have tasted, their demand is not so much the *fine* quality as the *large* quantity. I do not wish to say aught against quality, but quality is not everything. What's the good of quality without grapes? and every grape that is put out and recommended for quality alone will disappoint the people. Witness the hundreds of varieties that have been put upon the market with great pomp and high sounding names whose chief recommendation was quality, and not one has outlived its infancy. For farmer's use especially, we want certainty. If he plants a grape vine he wishes to grow grapes, and he has a right to demand them, taking the older varieties that are well known. Luckily we have some that are fairly good in quality and at the same time have the certainty of bearing large and regular crops of fruit.

The first thing to be looked at in selecting a vine is its leaves. These are more important than all else combined. It is the *leaves* that take the crude material furnished by the roots, and digesting it and holding it up to the influence of sun and air, in their fine network of veins, prepares food for the nourishment and growth of every part of the vine, as well the roots and stems as the beautiful, well ripened, melting fruit. So really the leaf is mother of the whole plant, and we want this strong, healthy and able to withstand the

attacks of both insects and diseases. Next see that the vine is a strong grower. But if it have large, thick and persistent leaves it can hardly fail in this respect. See also that it fruits well and that the fruit is good.

The farmer should not fall into the common error of buying too many varieties. Two or three that are known to produce yearly and well are much better than a dozen uncertain ones. My advice would be select first the *Concord*. But, says one, "Fuller says the 'Delaware is the highest flavored of all native grapes,' while Concord is third, or at best only second rate." But in answer, I have known the Delaware year after year to produce a fine crop of fruit, to drop every leaf just as the berries were beginning to color and before fit to eat, thus "keeping the promise to the eye but breaking it to the taste." Not so the Concord by its side. It would hold its leaves, thoroughly ripening every berry. I know the Concord is not of the highest quality, and that we all laughed at the award of the Greeley prize to it, but to-day it is the most popular grape grown. In proof of this please search the transactions of your own society. Next put Hartford Prolific. Again you are surprised and say "it drops its fruit." The certainty to bear is here, with the early ripening; the dropping of fruit depends almost entirely upon its situation and manner of training. In those favored locations where the Delaware holds its leaves and grows fair I would say include that. Catawba, where it will ripen, will give you fruit that, with proper care, will keep fairly well until March. But after all each must choose for his own locality, as not all grapes do equally well in all places, and no advice, however good, could be followed under all circumstances. Only I would again say, be very careful not to get too many varieties, and only those that are sure in your neighborhood to give a good and regular supply of fruit. As to the many new grapes just now seeking notice, among which are the Moore's Early, Brighton and Vergennes among the black and red; the Niagara, Prentiss, Duchess Pocklington, Lady and Lady Washington among the white; I can only say it will be a wonder if nine out of ten, or at least four out of five, do not prove, like the hundreds of others that have been heralded quite as loudly, and whose chief merit was their goodness, that they have too much of the foreign element, or are like the many good little children we sometimes read about, entirely *too good* and *too frail* for earth. Yet I am glad to say there are some that have all the constitution and vigor, with better leaves and quality of fruit, and more certain to produce large crops than that old reliable favorite, the Concord.

On this one point I think all societies interested in pomology should be very careful, namely, to tell the people clearly the characteristics of each new grape as it comes before them. Instead of classing all as *hardy grapes*, they should class them as *native* or *hybrid*, so all may know what they are planting and be prepared to treat each as it requires. Because a vine is a hybrid it is not necessarily worthless, but it requires different treatment from a native. Some of Rogers' hybrids, and the Brighton even, have been fairly successful, and I believe a large share of that success has been due to the fact that the people were told they were hybrid, and to treat them different from pure natives. Nor are all natives equally hardy and productive, as all know who grow grapes. While some are so delicate as to tantalize us with their goodness and frailty, others have the vigor and constitution of iron.

Being connected with a company that have one of the new white grapes in charge, and who will in due time offer it to the public, you can hardly expect it of me to say which are the most promising of the new grapes. They are so little known, and believing there is ample room for all good fruits, and as I

would do no injustice to any, let me only urge your representative men to visit each at its home, and see for themselves and report to you. They are men of intelligence, honesty, and experience, and you can safely rely upon their judgment. It would even be much better for your society to pay them for going than to let its members take the risk of buying all untried.

In this way you can easily find out whether they are strong, healthy growers and abundant and regular bearers of beautiful and good fruit, resisting all attacks of insects and disease, or are weakly, of slow growth, delicate of vine and leaf, and so subject to disease that they have to be continually doctored and dosed to "keep what little life they have," until a too confiding public shall buy enough to line the pockets of the trembling owners. On their representations you can safely rely, and your society shall have accomplished one of the greatest reforms needed in this age of humbug.

DISEASES AND INSECTS.

With the proper selection of varieties you should have no trouble in your State with diseases. If you find any variety subject to their attacks, the best remedy is the hoe, shovel, and ax; cut down, dig them out, and plant a strong grower in their place,—heroic treatment, but quickest and most effectual—*sure to cure*.

Phylloxera will give very little trouble with strong growing natives.

The steel beetle can easily be kept in check by watchfulness, catching and killing all you can find.

Thrips is the most troublesome of all insects, but I should think easily handled with your remedy of tarred paper.

Birds.—What shall I say of birds? Raise enough grapes for them and you; but if you find them so bad you must needs kill, remember they are your friends, and kill as few and kill them as easily as possible. But when the white grape comes, as come it will, as hardy, strong, and productive as Concord, by all means place that first on the list and set it largely, for birds have never yet troubled the white grapes, and I doubt if they ever will, and we shall thus be rid of the necessity of killing our best friends.

In conclusion let me urge farmers, and all others who have ground, to *plant grapes*. Select suitable varieties; give them the modicum of care, culture and training, and each autumn they will reward your efforts and bless you with such abundant crops of beautiful, refreshing, health-giving fruit, ripening and mellowing in the autumn sun, as you have never dreamed of; that shall make glad the hearts of your whole family, and shall be worth more in preserving and restoring health than all the medicine in the universe, and how much more agreeable to take.

Standing by the vine, bending 'neath its load,
Tasting of the fruit, melting, sweet and good;
Seeing the children, dancing with delight,
Feasting on the grapes morning, noon and night,
You will not regret your time, care or labor,
And ought not forget your friend or your neighbor,
Nor should you neglect the thanks that are due
The giver of good who gave them to you.

In continuance of the discussion of the grape question a letter was read from Mr. Edward Bradfield, of Ada, Kent county, Michigan, who, regretting his inability to be present and take a part in the discussion, sent a communication.

MR. BRADFELD'S OPINION.

ADA, February 9th, 1880.

"How can a supply of grapes for a farmer's home be cheaply grown?" This is an important question, and for myself quite a difficult one to answer intelligently without a blackboard. Ignoring quality of fruit, neatness, etc, I shall confine myself to the two points in the question, cheapness and supply. It is amusing to hear persons who can do almost anything else say "I am very fond of grapes, but I don't know how to grow them." As there is sometimes more truth than poetry in this remark, and to show how not to grow grapes, I will state two or three facts. Some fourteen years ago I induced one of those persons to try. He bought half a dozen vines, costing him \$5; after the ground was fitted the writer planted them and told him how to treat them, and to keep them as clean as he would a hill of corn. They all started well, and two years after, when my vines planted at the same time were bearing a light first crop of grapes, I visited him and inquired about the vines. He said he guessed they were all right, but had not seen them lately. We went out to where they were planted, and he began kicking away the weeds, which were about two or three feet high. After searching for some time he asked with amazement, "Was it not about here where the vines were planted?" adding, "I told you I didn't know how to grow grapes." Was his failure a want of knowledge, or for not practicing what he knew?

Another planted \$8 worth where the turkeys and chickens could have access to them. He was told he must keep them away. "Yes, he would," but in the fall there was not a vine left.

A recent case.—A party planted a lot of cuttings three years ago. Most of them grew, and from occasional letters I inferred he would have a supply of grapes the coming season. Going into the garden while on a visit there this fall, I could see no grape vines; corn, cabbage, potatoes, etc., had been kept clean. Past experience induced me to go to a large bed of weeds from three to four feet high; walking around the outside and peering in, not a vine was to be seen. On asking the lady of the house where the grape vines were, she referred me to the bed of weeds. There are none there, I said. She rather indignantly replied, "I know I saw one or two there before the weeds got so high." How soon will such people have a supply of grapes? The question is, how can it be done?

Prepare the ground by spreading a good coat of rotten stable manure on the surface, plow deep, and fit it as for corn. Make a trellis by setting posts eight feet apart along the row, and standing about seven feet out of the ground; use strips two and one-half or three inches wide and sixteen feet long. Nail one to the post twelve to fifteen inches from the ground and another at the top of the post, and the third one an equal distance between.

If you are a granger, join with your brothers and buy vines by the hundred. If not, go to the nursery yourself, and buy one or more dozen as you need; protect their roots from the sun and wind; plant four feet apart in the rows, with the view of taking out every alternate vine the fourth or fifth year. This will give you twice as many grapes for two or three seasons, or until the vines intended to be eight feet apart, about fill the trellis. Vines are cheap, and if the alternate ones are thrown away at that time, they will have more than paid the cost and trouble. I should plant the common hardy kinds,—Concord, Hartford, some Delaware, and for a variety a few Marthas. Two or three year old vines will bear soonest. Plant carefully, but not too deep; spread the roots

out evenly, cover three to four inches deep, and if the weather is dry mulch with rotten manure.

Time is money; hence the easiest and best method of pruning and training for the farmer is the arm and spur. Allow but one shoot to grow the first season, pulling off the rest when the best one is secured to a stake. Keep the laterals or side shoots pinched off to one leaf through the season. In the fall cut this shoot down to the top of the lowest trellis bar, bend it down on the ground carefully and cover with earth; tie it up to the bar in the spring and let the three upper shoots grow, treating those as the former one, by pinching off the laterals. In the fall cut the two outside shoots back to three feet each, and the center one to the top of the middle trellis bar; bend the two outside shoots carefully down to the top of the lower trellis bar, and fasten them there by tying with string.

We have now two arms on the lower bar each two feet long. If they have been handled carefully, each bud will produce a shoot two or three inches apart. As this will be too close for the bearing canes, the under buds except the end one, should be rubbed off after they start to grow, leaving the bearing canes from six to eight inches apart. If any of the upper buds fail to grow, the vacancy can be filled by a lower one. If three tiers of arms are wanted, three shoots are grown from the upper buds of the central shoot that extends to the top of the middle bar. These are to be treated as those were below, and in the fall the outside ones cut back to two feet, and the center one cut off at the upper bar. The canes on the lower arm are to be cut back to within two buds of the arm, except the end ones, which are cut back to two feet and laid down to complete the arm, and are to be treated as the first part was when laid down. The next pruning season there will be spurs with two canes, and to keep those spurs short the upper cane should be cut off below its base, and two buds left on the lower one. The two arms on the lower bar are now in what is called full bearing, having spurs producing two bearing canes each; and a continuation of the process above described will soon complete the arms above. The trellis will then be full, the vine will be in full bearing, and nothing is required but the simple annual pruning.

There is nothing new about this system, but it has some advantages. There is no danger from overbearing, and it can be quickly pruned. We do not have to stop and look to see which to cut away and which to leave. One tier of arms fifty feet long can be pruned in half an hour with small shears. There are many other systems of training, pruning, and caring for vines, and it is gratifying to the writer to know that several gentlemen will be at the meeting who have had more experience, and whose descriptive powers, with the aid of a black-board, will leave those who hear them, and do not grow a supply of grapes, without excuse.

I ought to have stated before, if a vine makes two or three shoots the second season seven or eight feet long, they can be cut back to four feet and laid down for arms, thus filling the trellis in half the time. The trellis can be extended indefinitely, and one or two tiers of arms grown instead of three. I think either of the former preferable where there is plenty of room.

To conclude, it is about as easy for a farmer to grow a supply of grapes as a supply of corn, and far easier than a supply of plums. Let any farmer plant twenty-five or fifty, two or three year old, hardy grape vines, give them the same attention the first two years he does a row of corn after planting it and he will have grapes in spite of any neglect afterward. He may train the trellis, let them run over a rail fence, or plant four feet apart each way and tie two

or three canes up to stakes four or five feet high. In either case he will have grapes. But if he has to mow down the weeds the first and second fall after planting to find the vines, he "speaks the truth and lies not" when he says he can't grow grapes.

Mr. H. B. Tucker, of Hillsdale, followed Mr. Bradfield's letter with an essay upon the same topic.

MR. TUCKER'S METHOD.

I am requested to state to our farmers how a supply of grapes for a farmer's home can be cheaply grown.

Before doing this let me ask you to take the position of a "Tight Barnacle," and learn "how not to do it." Don't begin by contracting with a stranger for vines who proposes to furnish new and very rare varieties—possibly a late importation of a famed old variety from California—an offspring of the big vine which was produced by planting the whip which the Mexican woman used in driving her cows from her old home in Mexico. When the vines come to hand, don't select a spot in the front yard, where the grass has been growing for twenty or more years, and with the grub-hoe cut holes through the turf just large enough to crowd the roots in and cover out of sight. Then don't spend ten or twenty dollars for a nice trellis or arbor for them to run on, for they will never run very far; so your time and money will be wasted. Nor don't plant them close up by the side of the garden fence, where you can't plow or cultivate with a horse on both sides of them. If the grape is not there already it will be very soon, as you will always be too busy to cultivate them with the hand hoe; so this will be little or no better than the front yard.

A good plan, and one that will be pretty sure to result satisfactorily, is to select a place in the garden so far from the fence that they can be plowed and cultivated each way; make the land as rich and mellow as for a good garden; then plow one or more furrows about ten inches deep and eight feet apart. The land being ready for the vines, go to a reliable nurseryman or vineyardist as near home as may be, and purchase from twenty-five to fifty vines, according to the number in the family; about three-quarters of them Concord, or some other good hardy native variety, and the other quarter Delawares. The vines should be from two to four years old, with a good supply of small roots. As soon as possible after removal from the nursery place them in the furrows, about eight feet apart each way; spread the roots as much as possible, and cover them with fine surface earth. Cultivate the ground thoroughly, keeping it mellow and clean of weeds and grass. This should be done every year. It is quite as difficult to raise good grapes without good, thorough culture as to raise good corn without it.

We now have the vines in the ground with directions for the proper culture to insure their growth.

We now come to the most important part of the whole business, which is pruning. On the knowledge and proper exercise of this act depends the question of success or failure in the production of fruit. Thousands of vines have been purchased and set by the farmers of this county which have not produced fruit enough to repay the purchase money. They have been set out and left to run in what has been called a "common-sense way;" that is, as they could. A good system of pruning is what is known among vineyardists as "renewal," which consists of cutting away all the old canes, and raising the fruit on those of the previous year's growth. Before setting the vines cut away all the canes except two, and leave two buds on each of them. The next November, or

after the leaves fall off, cut back again in the same way, leaving two canes with two buds on each. The second fall, if the vines have made a good strong growth, save two canes with about a dozen buds on each and three others with two buds on each, from which canes will grow for the next year's fruit. Up to this time the vines have needed no stakes. In the following spring set a stake and tie up the vines with wool twine or other suitable string. The next or third fall save three of the largest canes, about three feet long, for fruit, and two others with two buds on each to grow canes from for the following year. At this pruning cut away the old canes which bore the fruit, and continue to do so each fall afterwards.

After four years of good culture and proper pruning the vines may be fully established and capable of bearing a full crop of fruit, so that from four to six canes, four feet long, may be saved each year to bear fruit, and they will require two stakes to each root, one for the fruit bearing canes and one for the new canes, which will now require to be tied up so that the land can be cultivated. I prefer to use stakes instead of trellis. They are cheaper and allow a thorough culture of the ground with horse and plow.

If the plan be faithfully followed any farmer may expect an abundant supply of good fruit every year.

I recommend the Concord and Delaware for the reason that they both bear very good fruit, nearly or quite as good as any other native variety; especially on account of the vines proving perfectly hardy in our climate. I have not found it necessary to cover either of them in the coldest winter, and have not failed to get a good crop of fruit every year.

Mr. E. M. Potter of Kalamazoo followed with a short article.

MR. POTTER'S METHOD.

I am very glad that this subject is on the list for this meeting. It is a lamentable fact that a larger share of homes are either entirely destitute or but poorly supplied with this health-giving fruit, so rich in its refreshing nectar, its abundant supply of sugar, albumen, starch, etc., which combine to make it when well ripened, the par excellence of all fruits; and which can be grown in a greater variety of soils and locations than any we can name.

No matter how small the plat of the cottager, give the vine a good foothold and it will climb up to his chamber window, and offer him a wholesome tonic with the dawn of the September morning. Its rich clusters will impart new vigor when he takes his hour of rest and refreshment at mid-day, and adorn the tea-table or side-board after the labors of the day are done.

The most common mistake is made in planting varieties which will not do well except under the most favorable conditions, and very likely not succeed at all in this climate. After testing fifteen or more varieties, we are ready to say that if we were to plant only one-half dozen vines, or be confined to one variety alone, it would be the Concord. When well ripened it will suit the masses whose tastes have not been perverted by prejudice or educated in accordance with amateur notions. It can be cheaply put up in large jugs or stone jars for winter use, so as to be very excellent and please the most fastidious tastes, if one knows just how to do it.

For those who want a greater variety and will give them proper care, we would recommend for a list of twenty-five vines the following: Two each of Brighton, Delaware, Iona, Agawam and Salem, and fifteen Concord.

Select well-rooted two-year plants, and dry warm soil of moderate fertility, but if compact, work in coal and wood ashes, old bones, and rakings from the

yard. Plant eight feet apart, and train to a stake, or wire trellis, running north and south, or if only a single row, the direction may be east and west with vines trained upon the south side of the trellis, which is best made of good posts set firmly twenty-four feet apart, with three fence wires stretched horizontally two and one-half feet, four feet, and five and one-half feet from the ground. The Concord will succeed quite well when trained on an arbor, provided it extends north and south, and a combination of spur and cane pruning be adopted. In no case should the roots be allowed to get dry during the process of transplanting. When ready to plant, take the vine, or several of them, in the left hand, drawing the roots partially through the hand, and cut them all off at one stroke with a sharp knife, leaving them about six or eight inches long, and when placed in the hole the roots should descend a little each way from the center. Press the soil firmly about the roots, especially at the ends where severed. Cut all the top off except the strongest or center cane, and that to two or three buds, and when they are well started rub off all except the strongest; or if there seems to be no difference, leave the one nearest the ground, allowing but one cane to grow the first season. If that be strong, say one-half inch in diameter at the base, the following November cut back to three buds, allowing two canes to grow the second season. The next November cut off the strongest cane to four and one half or five feet, and the other back to three buds, and lay down the long cane and throw on a spade full of earth to hold it down for winter protection. The next, or third spring, after the buds begin to swell, tie up the long cane to the stake or trellis, and allow two new canes to grow from the spur at the base, and they also should be tied to the trellis as they extend their growth. The next November cut back the single bearing cane to three buds and two new canes four and a half or five feet long and lay them down as before for winter protection. The general principle to be adopted is to cut out the old wood and allow the new wood to start as near the ground as possible, increasing the number of bearing canes each year according to the strength of the vine. The essentials are, good healthy vines of suitable varieties to start with, dry soil, not too rich in vegetable deposits; cultivate shallow and often during the summer months; yearly pruning, plenty of leaves, but not too much wood; free circulation of air and sunshine, and lots of children to eat the grapes.

Pres. Smith.—I would like to ask Mr. Woodward why my grapes did not ripen? There was a great abundance of leaves and I cut them away a good deal to allow the sun to reach the bunches.

Mr. Woodward.—You are a farmer and I will use a farm illustration. You can as well expect a calf to live and thrive and mature if you cut out his stomach as to expect grapes to grow and ripen when you remove the leaves.

Mr. Lannin.—It is all wrong to remove the leaves, but I find it necessary oftentimes to head in the shoots that grow rampant.

Mr. Holloway.—Save the leaves but pinch in the tips of the long shoots.

Some one asked about the Croton as a grape for the farmer.

Mr. Lyon.—The Croton is a light grape of excellent quality, but the foreign blood in it renders it liable to mildew, and it will prove very unsatisfactory as a grape for the farmer. I wish while I am up to say that the management of grapes in Mr. Woodward's location or upon the lake shore will hardly do as a model for farmers in the interior of our State, for while we have no necessity for laying down in winter the ordinary native varieties to secure the best results, inland this is quite necessary.

STORING WINTER APPLES.

Mr. S. W. Dorr, of Manchester, Washtenaw county, next gave an essay on the above topic.

In speaking for a few moments briefly upon the best method of storing winter apples, I desire to make a few suggestions in regard to the best manner of picking, packing and handling winter fruit, as it must be apparent to all that in order to succeed in keeping we should spare no pains in having our fruit come into winter quarters in the very best possible condition. It matters not so much what quantity we are able to produce in our orchards, but it is a matter of great importance how much of the crop we have been able to secure for future use upon our tables or for the market; or, in other words, has the product of our orchard supplied our families with a plenty of fresh fruit five-sixths of the year, and also materially replenished the contents of our pocket-books during the same length of time.

In picking, first provide yourself with nimble hands, convenient ladders, suitable baskets, holding not over one-third of a bushel, with a bail turning down and a wire hook attached. Ascend the ladder with the basket on the left arm, grasp the fruit firmly, at the same time turning the hand so as to sever it from the tree; lay it in the basket. When filled pass it to a person on the ground to sort, making two grades—good and extra—rejecting all inferior fruit. Fill the barrel by putting the filled basket inside, not pouring from the top. The barrel should stand on a board and be shaken often while being filled to obviate too severe pressing.

Expert picking and careful handling is a very important part of the process. But the time of picking is of much more importance. In my opinion apples should be picked as soon as fully grown. When matured the sooner severed from the tree the better, although perhaps perfect ripening may not follow in weeks, or even months. It is a fact worthy of notice that we as farmers allow our fall apples to ripen on the tree and become mellow, fall to the ground, become sunburnt or otherwise unfit for use or to be devoured by pigs. Thus, after years of toil and care in raising a choice fruit, and when just within our grasp, we permit it to be snatched away and come to naught. Consequently, for the next two or three months perhaps we have no fruit fit for family use or inviting to a friend. Yet, had this same fruit been picked at a proper time and placed in a cool cellar we should have had a plenty of ripe apples at Christmas. Again, our principal varieties of winter apples in this locality usually are matured by the first of October and should be picked immediately. Yet it often occurs that these are not gathered until after severe frosts, or even our first falls of snow. If apples are allowed to become over ripe the tissues of the fruit are broken down, and if such fruit comes in close proximity or contact with other fruit, mark the progress of decay. Especially in warm, damp cellars does the poisonous fungus soon germinate.

Here, then, lies the great difficulty in the way of the farmer becoming a successful orchardist. By the pressure of farm work we too often neglect to pick our apples until one-third are on the ground, and the remaining two-thirds are worthless, or nearly so, for keeping any length of time.

The old practice of *shaking* and *clubbing* fruit from the tree—long ago discarded by all good orchardists—is unworthy of our notice; so also the practice of carrying apples to market long distances loose in a lumber wagon proves nearly as disastrous to the fruit, and quite as much so to the farmer's pocket.

This brings us to notice the first clause of the question, the best method of

storing. Before heading the barrels, bring the fruit from the orchard, place it in a store-house or shed, there to remain two or three weeks for the purpose of passing through what is called the sweating process. Allow the doors to remain open to admit a free circulation of air in fine weather, but close on damp or rainy days. Here at leisure the apples may be pressed, headed, marked, and turned down on the side to allow the pressure to become uniform in every part of the barrel. We prefer to let them remain as late as possible in this condition without too much risk of freezing, although the weather may be cold, bearing in mind the fact that warmth and moisture are the only necessary agents to bring forward ripening and mellowing, and produce the spores of fungi which cause mildew and ultimate decay.

As winter approaches, the inquiry forces itself upon our minds, how can we keep our apples in sound condition from December to May? Storing in the ordinary manner in the farmer's cellar, or even in a frost-proof building, does not accomplish the purpose. The failure, undoubtedly, is in a great measure due to the want of proper ventilation and a sufficiently low and uniform temperature. For a number of years past the orchardists of our State have felt a pressing need of a suitable store-house for winter apples, pears, and other fruits. In seasons of great abundance, like that of '78, when thousands of bushels of fine fruit were left ungathered in our orchards, while every available market was glutted with fruit, and the prices so low as to leave no profit to the grower, we often heard it remarked by the farmer, "Our apple orchard is the most unprofitable part of our farm;" and in many cases the following winter the axe is laid at the root of the tree, and it is no longer permitted to encumber the ground. Yet, with all the discouraging experience of the past, it is a well-known fact that there is always a demand in spring for good sound apples in our large city markets, and at remunerative prices. Hence the question, is it profitable for Hillsdale orchardists to store for spring sales? We have it in a nut shell; I would say, "Yes; if we have the facilities for keeping them sound."

Various kinds of fruit houses and refrigerators have been constructed wherein ice is used as a cooler, and chemicals for absorbing moisture. Most of these have proved objectionable on account of the fruit not sustaining its keeping qualities when exposed to the air in spring, or the action of the chemicals used materially injuring the flavor of the fruit; also, such houses have been found too expensive to be of practical value to the farmer.

In order to preserve our fruit in the condition as near as possible as when plucked from the tree, the principle requisite seems to be that it be placed in air of very low temperature,—near freezing point,—with draught sufficient to carry off surplus moisture and purify the room. The fruit may then remain in the same condition for an indefinite length of time.

Perhaps no plan as yet has been devised whereby all the requisite conditions are perfectly secured; yet by untiring diligence and perseverance, and the ingenuity of man scientifically applied, we may soon hope to be able to obtain the desired result.

Pres. Smith.—I have a thousand-barrel cellar that is adapted to the keeping of fruit; still, my experience has been that there is more profit in the sale of the apples soon after plucking from the tree.

J. D. Baldwin.—Apples to bring the best price must be as far removed from the glut of other fruits as possible, and because they can be preserved, there is profit in growing them. To get the most money out of the apple crop, there

must be some means of storing for spring sales. The great want now is a method that shall eliminate the losses by decay which we are now subject to in our ordinary cellars.

II. P. Hanford, Bristol, Indiana.—I have seen apples sold for seventy cents a barrel,—good nice apples. One might as well give them away and have done with it, if this is a necessity; but there is no need of this, if we will take proper steps to save our fruit until the rush is over. I can keep apples as well as potatoes with as little percentage of loss,—will use no ice, but substitute strong common sense. My house is known as a Cope house. We use lots of saw-dust, but no ice. A building suitable for this purpose can be erected for four hundred dollars, large enough to store three thousand bushels,—will require no watching, and save the apples perfectly. The plan is to save the cold air in the building when it is warm outside, and maintain an even temperature when it is very cold outside.

Mr. Bryan.—Almost everything depends on the time of picking. If the apples are too ripe, or it is too warm when they are packed, no system in the world will make good keeping fruit of them.

N. Bogue, Batavia, N. Y.—We had no choice in weather last fall; it was hot all the time until the fruit fell to the ground, and there was no cool place to store our packages, so a large proportion was lost.

Mr. Dorr spoke of varieties changing. The Rhode Island Greening used to be called a winter apple, but with him it had a habit of maturing in the fall.

Mr. Lyon.—This depends on locality; on our west shore there is no question but that it is a winter apple.

DISCUSSION ON FERTILIZERS.

The discussion of manures was next brought up, and this discussion was principally confined to salt. At the request of Mr. Holloway, Mr. Cottrell related an instance in which by mistake one ton of salt was applied to each acre of a ten-acre wheat field which had been sown to timothy seed. This occurred near Detroit a few years ago, and the owner expected that his wheat and timothy were both ruined, but to his great surprise the wheat was not injured, and the timothy grew too large to be first quality. The next year and each year since the timothy crop has been a good one, and no manure has been applied since.

Mr. Cottrell said he used salt among his small fruits. He said he should be cautious about applying salt in the spring or when the ground was wet. Prof. Beal regards salt as an excellent manure. Mr. Guild, of Saginaw, said that there was no difference in the quality of refuse salt and good salt, only in the dirt. Mr. Cook, of Grand Rapids, said that too much salt should not be applied to fruit trees, although a limited quantity was perhaps no injury. Mr. Campbell, of Ypsilanti, said that as he understood it the salt was only beneficial as it helped to liberate the manurial qualities of the soil. Mr. Satterlee having been called upon, stated that salt, like plaster, as he understood it, was of little good in itself, but that it was very useful in liberating manurial qualities from the soil.

The discussion upon this topic lasted until time to take the recess for tea, and it was discussed by several others who substantially agreed with those above quoted.

Thursday Evening Session.

The evening session was upon an entirely new plan. It was largely of a social nature, and there were short responses to topics by prominent members of the society, friends from abroad, and citizens of Hillsdale, interspersed with delightful music. The instrumental music was furnished by the Knights Templar band and all of the pieces were delightfully rendered. The vocal music was composed of charming ballads, duets, and a medley by Misses Weir, Cutler and Allen, accompanied by Mrs. Lancaster, who presided at the piano.

The topics and list of those who responded to them were as follows:

"Ornamental effects of woodlands left for timber," James Satterlee, Greenville; "Hygiene of small fruits for the farmer's home," Dr. Whelan, Hillsdale; "Western New York, the cradle of Michigan horticulture," J. S. Woodward, Lockport, N. Y.; "Window gardening," Miss Van Valkenburg; "Lawn making and lawn mending," E. L. Koon, Hillsdale; "Common mistakes in fruit culture on the farm," Dr. Underwood, Hillsdale; "Birds and berries," H. P. Hanford, Bristol; "Horticulture and homes," the Hon. Henry Waldron; "Farm study of flowers and insects," Prof. Beal; "Using surplus fruit. S. B. Mann, Adrian; "Vegetables and health," E. F. Guild, East Saginaw; "Horticulture a factor in home life," the Rev. V. L. Lockwood, Hillsdale; "Horticultural humbugs," Geo. A. Smith, president of the agricultural society; "Apple is king in pomology," Col. F. M. Holloway, Hillsdale.

The attendance in the evening was very large, every available seat in the hall being occupied and the new feature proved to be a decided success. Too much credit cannot be given, however, to those who were in charge of the music, for this was the inspiration which brought out the admirable responses to the topics.

Friday Morning Session.

The third day's session was opened at 9 o'clock with President Lyon in the chair. The attendance was large, notwithstanding the earliness of the hour.

Prayer was offered by Rev. Levi Tarr, of Hillsdale, after which the society listened to the

REPORT OF THE COMMITTEE ON EXHIBIT.

Your Committee on Exhibit would respectfully report as follows:

There is not so large an exhibition of fruit as we would enjoy looking over, but the quality of that shown is very fine, and the varieties have been well kept.

Fruits are shown by the following exhibitors:

P. F. Chambard, Fulton Co., O., 7 plates apples; John Stoddard, Hillsdale, 8 plates apples; S. M. Pearsall, Grand Rapids, 1 plate apples; E. Buell, Kalamazoo, 4 plates apples; John Quackenbush, Hillsdale, 4 plates apples; S. W. Dorr, Manchester, 1 plate apples; H. McCowan, Hillsdale, 1 plate apples; Mrs. T. Hutchins, Hillsdale, 2 plates apples; Chas. R. Coryell, Hillsdale, 6 plates apples; A. Hewett, Hillsdale, 5 plates apples; F. M. Holloway, Hillsdale, 4 plates apples; John Chilson, Hillsdale, 14 plates apples; A. Hewett, Hillsdale, 2 varieties potatoes; A. Dunton, Hillsdale, 3 varieties potatoes.

Several varieties of corn are on exhibition, including one ear sent up from the Indiana Horticultural Society, which contains over 1,500 kernels, said to be the most ever grown on a single ear.

There is on the table also a bunch of Minnesota cane seed.

The flowers shown are very fine. Two plants by Mrs. T. Hutchins, and the remainder, a beautiful exhibit, by W. Hughes, a florist of Hillsdale. The plants are healthy and very deftly arranged for effect.

We wish also to mention a box of growing wheat, showing the germination and growth at various depths from half an inch to eight inches, shown by Mr. S. N. Betts of Hillsdale. It cannot fail to be of great interest to farmers.

The four plates of apples shown by Mr. Buell were Northern Spies—twenty specimens—large and luscious of this grand old variety. It is a common interrogation, "How does Mr. Buell succeed in getting such beautiful specimens?"

J. S. WOODWARD,
E. W. COTTRELL,
H. P. HANFORD,

Committee.

Report accepted and adopted.

There was now opportunity given for questions to be sent in. About thirty were sent to the Secretary's desk, but a few of which could be considered for want of time.

1. Are angle worms injurious to pot plants?

Answer by Prof. Beal.—It is the safest way to keep all the animal life out of the pots. The use of lime water is recommended to rid the soil of the worms.

2. How many hours should we work in the day?

This question was answered by a number of gentlemen and one lady, the universal opinion being that farmers, and particularly farmers' wives, take too little recreation, put in too many hours of work, and do not generally take care of themselves well enough.

3. What papers should we take for family reading?

Several responses. One gentleman, Mr. Campbell, believed in having the home tables covered with recent papers, so that the family could all be supplied according to their individual tastes. He thought papers a good substitute for amusements that are more expensive and less lasting, that are in many households taken away from home. Mr. Hewitt could see that in many homes it would be impossible to have many papers, but thought it important to have reading matter enough to post the family in the political, religious, farm and household intelligence of the day. Some one suggested that in some of our family papers, like the Detroit Tribune, New York Tribune, Post and World, Rural New Yorker, and Country Gentleman we had in one paper the entire field covered, giving in each especial importance to one feature, which could be selected according to desire.

4. What kind of peach trees shall we plant in Hillsdale county, and how far apart?

Answer.—Any of the leading varieties, beginning with the earliest and making a succession, only not planting a later variety than Hill's Chili. They should be planted 16 feet apart.

5. What kind of apples for market?

The querist was referred to the fruit catalogue of the society for an answer.

6. Is the Crescent strawberry worthy of cultivation for market or home use, and is the Sharpless good for market?

Answer.—Crescent is a strong grower, healthy, and is taking quite a prominent place as a market sort. The Sharpless, as far as it has been tried in Michigan, does very well, but for market is proving pretty soft. There is no danger of its superseding the Wilson.

7. Which is the best of the new colored grapes?

Several gentlemen of experience named the Brighton.

8. Which is the most promising of the new white grapes?

Mr. Woodward was asked to give his preference outside of the Niagara (which was known to be his own grape), and he replied "unquestionably the Prentiss." Quite a discussion upon this topic brought out the champions for several of the later white varieties, including the Lady.

9. What is the best evergreen for ornamental hedges, and how expensive is it by the hundred?

Answer.—The hemlock. Good hedge plants can be purchased for \$12.00 per hundred, and of small size for a good deal less.

10. Shall we grow the Russian apples in this climate for profit?

Mr. Coryell.—No. We have better varieties that can be grown easily, and why waste time on the Russians. They are, without doubt, great acquisitions in the North and northwest, but we can do better with our climatic advantages.

Mr. Lyon mentioned the Red Astrachan, Duchess and Alexander as apples that were types among the Russians and had been made profitable with us, but in general agreed with Mr. Coryell.

A general discussion upon birds followed, after which Mr. Baldwin gave, by request, the following list of peaches to plant: Alexander, Hale's, Troth's, Crawford's Early and Late, Old Mixon, Hill's Chili, and Smock.

The hour of adjournment having nearly arrived, the committee on resolutions made the following report, which was adopted by a rising vote:

The committee on resolutions would respectfully report the following resolutions, and recommend their passage:

Resolved, That the thanks of the Michigan State Pomological Society are hereby returned to the officers and members of the Hillsdale County Agricultural Society for their kind invitation to us to hold this our winter meeting in connection with their farmers' institute; for the free use of this commodious hall; for their generous hospitality in making our society, and our many friends from a distance, their guests, and for the constant efforts on the part of the officers of said agricultural society to make our entire session both pleasant and profitable.

Resolved, That our thanks be also returned to those who have added interest to our meeting by the exhibition of fruits and flowers and products of the farm; to the professors of the Agricultural College, who have favored us with their presence, and added much to the value of our session by their able scientific addresses; to the several ladies who have furnished essays; to Mrs. Lancaster and her quartette of vocalists for their acceptable rendering of several songs; to the Knights Templar Band for their excellent music; to the representatives of the press for attendance upon our deliberations, and so full reports of our proceedings; to the excellent hotels of Hillsdale for their generous reduction of rates for our entertainment; to the officers of our own society, especially to our venerable and much respected President, and our faithful and most efficient Secretary and Treasurer, for their unceasing efforts to build up the interests of our society, and to make all its meetings of the greatest possible advantage to the pomological and horticultural interests of our noble State.

J. WEBSTER CHILDS,

W. N. COOK,

J. D. BALDWIN,

Committee.

The Secretary then announced that the June meeting would be held in Bat-

tle Creek, and that the new constitution would come up for final action at that meeting.

Adjourned.

Among the prominent horticulturists present at this meeting from abroad, were T. T. Lyon, J. Lannin, A. D. Healy, and F. Linderman, South Haven; W. N. Cook, S. M. Pearsall, Chas. W. Garfield, Grand Rapids; W. H. Schuyler, Chicago; S. B. Mann, Peter Collar, and Dr. W. Owen, Adrian; Prof. W. J. Beal, Prof. A. J. Cook, Lansing; J. D. Baldwin, J. Austin Scott, J. J. Parshall, Ann Arbor; J. W. Childs, Robert Campbell, Ypsilanti; H. W. Doney, W. K. Gibson, Jackson; E. F. Guild, East Saginaw; S. W. Dorr, Manchester; Geo. D. Kies, Clinton; George Taylor, Kalamazoo; E. W. Cottrell, R. F. Johnstone, Detroit; Mr. and Mrs. N. Chilson, Battle Creek; James Satterlee, Greenville; J. S. Woodward, Lockport, N. Y.; N. Bogue and Brother, Batavia, N. Y.; H. P. Hanford, Bristol, Indiana.

The following newspapers from outside of Hillsdale were represented: Post and Tribune, Michigan Farmer, Michigan Homestead, Saginaw Herald, Indiana Farmer, Grange Visitor, Adrian Times, Rural New Yorker.

THE SUMMER MEETING.

HELD IN THE CITY OF BATTLE CREEK JUNE 16, 17 AND 18. RECORD
OF DISCUSSIONS AND FULL TEXT OF LEADING PAPERS.

Early in the year a letter of invitation numerous signed, came before the Executive Committee of the State Pomological Society from the people of Battle Creek, cordially inviting the Society to hold its Strawberry Meeting in their city. The invitation was accepted, and the programme announced for the 16th, 17th and 18th of June, to open with an evening session on the first day.

During the afternoon previous to the opening of the meeting, quite a large number of fruit growers gathered in and about Stewart's Hall, and discussed informally the horticultural promises for the year, and all agreed that never in the history of the State had there been an indication of a greater abundance of fruit of all kinds.

Wednesday Evening Session.

At the proper hour President Lyon took the chair and called the convention to order. Rev. D. R. Shoope, of Hastings, Barry county, conducted appropriate devotional exercises, and a choir from Pennfield Grange, led by Mr. Poole, furnished an abundance of excellent music to enliven the exercises of the evening.

Secretary Garfield read a communication from J. S Comings, of St. Joseph, as follows:

Chas W. Garfield, Secretary, etc.:

MY DEAR SIR:—Please present the following receipt for saving fruit from curculio, at your June meeting:

Two pounds of whale oil soap boiled in water enough to fully dissolve it; add while hot, 1 pound of tar, stirring it in; mix with 15 gallons water, and with syringe shower it over the trees thoroughly. Repeat after every rain storm.

This will save plums or peaches from the curculio. It will also drive away the cabbage worm and the squash bug. It is well worth trying by the plum growers of Michigan.

I wish you would also present the following question for consideration:

In growing grapes upon wire trellises, why not let the permanent arms be trained upon the *upper wire*, letting the fruit and new growth *hang down*, and *not tie it*?

This will save five to eight dollars per acre for tying, as usually done, by having the arms upon the *lower wires*, and tying the new growth to the upper wires.

Yours, truly,

J. S. COMINGS

President Lyon said he had little faith in any remedy for the curculio, unless its resultant was the death of the insect. The one suggested by Mr. Comings, perhaps, was as good as any of its class, but the immediate aim of driving off the curculio by means of something offensive to it was not conclusive enough in its results.

Mr. E. J. Shirts said in their country, after a good deal of experience, they had settled down to the jarring process as the only available means of fighting the curculio.

A member remarked jocularly: "I did not know before that you had the curculio in Oceana county. This is the first time it has been admitted in a meeting of our society."

Mr. W. A. Brown of Stevensville spoke in terms of commendation of the plan of tying grape arms to the upper wire of the trellis, and spoke of instances in which the plan had been successfully employed in large vineyards.

A communication was read from Mr. N. A. Beecher of Flushing, Genesee county, inquiring if it was desirable to ventilate barrels of apples intended for market.

Mr. Baldwin, Ann Arbor—The answer to this question will depend almost entirely upon the condition of the apples when placed in the barrels. If the fruit has gone through with the sweating process and is packed dry, no ventilation will be needed. If otherwise, air must be given.

A. C. Glidden, Paw Paw—Early apples need ventilating on account of the time of year and consequent condition of the weather. Winter apples shipped in cool weather must be put up tight. The closer the better.

Mr. Lyon—There are two classes of winter apples that are marketed: 1st, the Russets, which will not bear ventilation; 2d, apples like Spitzenberg, Baldwin, Red Canada, Bellflower, etc., that will bear an open barrel, but I have always doubted if they were any better for it.

"MORRIS RED."

At the February meeting of the State Pomological Society held at Hillsdale, B. W. Steere, S. B. Mann and D. G. Edmiston were appointed to name or not, at their discretion, the apple locally known in parts of Lenawee county, also in Fulton county, Ohio, as "Steele's Red," or "Steele's Red Winter," and report to the June meeting, also to the Lenawee County Farmers' Club.

A communication was read from Mr. Steere as follows:

Chas. W. Garfield, Secretary, etc.:

MY DEAR SIR:—The committee met at the office of S. B. Mann and resolved that said apple be hereafter known as the "Morris Red," and that B. W. Steere be a committee of one to report action to the Farmers' club, also to the June meeting of the State Pomological Society, with history and description. It is very desirable that the confusion existing in regard to the name "Steele's Red" be cleared up, and we call upon all who would aid in this good work to adopt the new name at once, and would especially urge the necessity of nurserymen and dealers invariably labeling trees and barrels: "Morris Red." As I was unable to procure good specimens, an accurate description must be deferred, but hope to send it to yourself or T. T. Lyon in time for next catalogue. The history of Morris Red, as I learn it from Mr. Morris, is this: The original tree grew—or may still grow—in Connecticut. Two "sprouts" dug from its roots were brought by a Mr. Childs to Madison county, N. Y., fifty or sixty years ago, and planted near Mr. Morris' former home. From these trees Mr. Morris brought cions to Fulton county, Ohio, and from there to this county. He informs me that on revisiting Madison county a few years since, he found the two trees in vigorous health, bearing good crops, and large and strong enough to support a heavy swing pole reaching from one to the other. Of course I cannot fully indorse an apple on such short acquaintance, especially as to character of tree, uniform productiveness,

and the thousand and one things that make a *really* valuable fruit, but may safely say I believe it may be put on further trial with those that promise well. I think it as handsome as Red Canada or Baldwin, will average as large as the latter, appears to keep as well, and looks somewhat like it, but more closely resembles a fine colored Hubbardston Nonsuch. In quality it will probably rate as "very good." I still sometimes think it may prove an old named sort, but my confidence in Mr. Morris and his straightforward story make such a supposition, to say the least, extremely doubtful.

B. W. STEERE.

The Secretary also read a letter from Prof. S. M. Tracy, Secretary of the Mississippi Valley Horticultural Society, concerning the autumn fair of that association, urging Michigan to make an exhibit there.

On motion the matter was referred to the Executive Committee.

The next exercise was a paper read by Dr. D. C. Hawxhurst of Battle Creek on

THE USE OF THE MICROSCOPE BY FRUIT GROWERS,

in which the writer took strong ground in favor of the microscope as an efficient assistant to the careful fruit-grower. Several communications were also read on this subject from other parties, some opposed and others strongly in favor of microscopical research to aid the labors of the pomologist.

[The full text of the paper will probably be given in Secretary's Portfolio. —Sec'y.]

Following Dr. Hawxhurst's address, the meeting adjourned.

Thursday Morning Session.

The Society convened at an early hour, and while the audience were gathering, fruit-growers were called upon to report from their various localities upon any matter of special interest.

Mr. Emmons Buell reported for Kalamazoo:

Strawberries, a good crop. The market is well supplied at from 5 cents to 8 cents per quart. Raspberries and blackberries promise a good supply. Currants and gooseberries are doing their best to supply the sharp demand for these fruits. Grapes indicate a fair crop. Cherries, sour, a good crop, especially Early Richmond. Sweet cherries somewhat variable. Hardly an average crop. Napoleon, fair. Plums, where receiving proper attention, are doing well. Peaches never looked better. Every tree is loaded with rich promises of this luscious fruit. Apples, so far as my observation extends, indicate an average crop. All plants, vines, bushes and trees appear to be healthy and making a vigorous growth.

Chas. R. Coryell reported for Hillsdale:

We have apples usually when there are any, and this season we shall have a grand crop. Peaches wherever there is a tree have set full. They are growing in some places where they were never known to before. Cherries have blighted somewhat, and the same may be said of raspberries and pears. In truth our pear trees are going rapidly before this fell destroyer.

Mr. W. A. Brown spoke for Berrien county:

The apple trees blossomed full, but the promise then given will not be fully realized. The crop will be below the average. Of peaches the less said for our county the better. They are nearly gone, and many of us feel that if not a tree were left as a prey for the yellows we would sooner reach that point when we could grow again this luscious fruit.

Raspberries are with us, perhaps, one third of a crop. Blackberries will fruit heavily, and grapes were never better.

Geo. W. Bridgman, from same county, spoke of some of the difficulties that harassed the fruit grower in their vicinity. Said he: "The rust upon our berry vines and bushes is getting to be a terrible scourge. It is not confined to raspberries and blackberries, but many varieties of strawberries are about destroyed by it. I would like to propose the following questions? Does kind of soil make any difference with rust? Does not season influence it?"

In reply to the question, "What variety of strawberries is most exempt from rust in Berrien county?" W. A. Brown said that the Crescent was the only variety which appeared wholly free from rust, and was proving the most prolific berry grown, but was not as good in quality as the Wilson, and is too soft for Chicago market.

Van Buren reported a fair crop of apples and plums in prospect, and good crops of strawberries and cherries; black raspberries make a poor showing; grapes good on high ground, but poor on low; peaches had not been damaged so much by the curculio as usual.

The audience having gathered in, the first topic for discussion was taken up, to wit:

GUMPTION IN HORTICULTURAL OPERATIONS.

Mr. H. Dale Adams, of Galesburg, opened the discussion by asking some one to give a definition of gumption. He hadn't consulted a lexicon and was not prepared to proceed without a proper understanding of the term.

W. W. Tracy, Detroit, said he supposed that the term, in this connection, referred to that quality of mind which would seize upon any new ideas and contrivances that promise good results, and "practically employ them in the business of horticulture. As an illustration he exhibited a home-made seed sower. It consisted of a tin tube about 4 feet long, and $\frac{3}{4}$ inch diameter, on the top of which was soldered a funnel, into which the seed is dropped by the fingers of the right hand. A small tin box, to hold the seed, is attached to the funnel, and a brace or crutch extends from the seed box to the arm pit. Mr. Tracy could drop seed as fast as the most elaborate drill, and was sure of distributing the right quantity. It was not a patent implement, and received the hearty commendation of all present.

Mr. E. M. Potter, of Kalamazoo, wanted to know of some practicable method of destroying moles, and wished that some one would bring their gumption to bear upon it.

Mr. Bridgman thought it a grave question whether this was a proper channel to develop gumption in. He was not certain that moles were altogether a nuisance.

Mr. H. Marvin, of Ovid, said moles did some injury, but more good in catching insects, and hoped no one would even suggest a good plan of catching them.

W. A. Brown thought "gumption" and close habits of observation of great importance to fruit growers, but the causes of our most destructive diseases remain undiscovered. The commercial interests of the fruit grower in Michigan were of vast extent, and the State should employ the most eminent scientists and entomologists to assist the fruit grower in learning the causes and remedies of such inscrutable and destructive diseases as the pear blight, peach yellows, and small fruit rust.

W. K. Gibson defined "gumption" as that faculty which leads a man to seize upon the advantages that come with emergencies. It is a power in reserve, which some men hold more than others. He had seen this illustrated in all phases of life, in horticulture, in marketing, as truly as in seeding and harvesting.

Mr. Adams now presented to the meeting a simple plan of using the garden line, saying that many gardeners worked at a great disadvantage because they allowed the line to be always in the way. His method was to simply draw the line taut, and by passing the blade of a hoe over the line an impression is made that will stand quite a storm. He exhibited the "Eureka" post-hole digger, saying his use for it was in the removal of small plants like strawberries. He had had as good success by using this in transplanting young strawberries as by the use of pot-grown plants. He asked for that mole trap that his friend Potter had called for.

Mr. W. A. Brown said the most effective trap he knew of was a faithful boy to watch and throw them out of their burrows as they traveled along. This could be done most satisfactorily in the evening or early morning.

Mr. Bridgman advocated that the mole be saved, that the strawberries might be saved from the ravages of the May beetle and cut worm. These pests formed the main living of the mole, and we could afford to lose a few plants by moles and have the remainder saved from worms.

Mr. Potter objected to Mr. Adams' use of the hoe upon the garden line, saying that very soon it would spoil a hoe for use. He practiced snapping the line as the carpenter does a chalk-line.

Mr. Gibson spoke of the value of straight rows, not only as a matter of economy, but as an indication of thrift.

Mr. I. W. Marsh, of South Haven, exhibited a whiffletree guard. This guard is a simple but very practical device consisting of a metal strip, forming a smooth connection with the tug and extending past the hook and end of the whiffletrees, so as to prevent their rubbing or even touching the trees, allowing them to slip smoothly by without injury. It is also useful to prevent whiffletrees from catching in fences, gates, posts, etc., or breaking over standing corn, cane and cotton.

Mr. Jeremiah Brown, of Battle Creek, had used salt to kill cut worms upon asparagus and strawberries with a large measure of success.

Mr. Marvin believed in salt and freezing to kill cut worms.

Mr. W. A. Brown thought it required a goodly amount of "gumption" to employ salt discreetly and with the best effects. He thought we should use it with great caution until we knew more about the results.

Mr. Bridgman argued that salt was a specific and not a general fertilizer, and when we knew just when it was needed it would be a great aid to horticulture.

W. W. Tracy explained Mr. Crawford's plan of setting out an orchard. (This will appear in full in the secretary's portfolio).

A general discussion ensued, which was taken part in by Messrs. Lyon, Tracy, Baldwin and Adams, on the best method of surmounting the difficulty of getting straight rows over a hill, following which the convention listened to a paper by Mr. Jeremiah Brown on

SMALL FRUITS FOR THE FARMERS' HOMES.

My chief aim in this article will be to show how small fruits, for family use, may be successfully grown with little care, in good garden soil. For

STRAWBERRIES,

the first and great requisite is a good, deep, rich sandy loam; if the soil is of a clayey nature, it must be well drained, or success in growing fine large berries must not be expected. On sandy or gravelly soil a fair crop may be obtained in favorable seasons, but such soils are not the natural home for them, and should be avoided if possible. The strawberry may be increased almost indefinitely by runners. For summer planting I would advise the use of two-inch flower pots; sink them in the ground up to the rim, fill with good soil, and lay the end of the runner on it and place on it a small stone to keep it down; in ten days or two weeks it will be rooted and may be transplanted at any time, *even in hot dry weather, if properly watered and shaded*. All runners must be cut off as fast as they appear, as each one will rob the plant of one fruit bud, and as a matter of course will lessen the crop to that extent the following year. With such management I have succeeded in raising a large crop of extra fine berries the following year. A cheaper way is to plant last year's runners as early in the spring as the ground can be worked.

For garden culture, plant in rows two feet apart; set the plants at the distance of 12 inches; cut off all the blossoms and runners as fast as they appear; as soon as the plants begin to grow, stir the ground often, and do not suffer a weed to grow.

In the fall, after the ground is frozen, mulch with clean straw or marsh hay, two inches deep—more may smother the plants in a mild winter; in the spring uncover the plants; let the mulch lay between the rows until the fruiting season is over—but a better way is to take off the mulching entirely, dig the soil over with a garden fork, but do not disturb the roots of the plants, then replace the mulch—it will help to keep the ground cool and moist, both very essential during flower and fruit season. Let me repeat, that the strawberry delights in a rich, friable soil, made so by the use of manure, leaves, ashes, and muck. A compost of these should be worked over two or three times during the summer, and after the ground is prepared the compost may be put on and then you are ready to plant. A good crop will be your reward if the spring frosts do not destroy your fondest hopes.

For field culture, the rows should be three feet apart, and the plants set 12 inches apart in the row. A large part of the after work may be done with the cultivator; in other respects the treatment should be the same as in garden culture. For spring planting I would advise shortening the roots one-fourth; this will increase the number of rootlets and give vigor to the plant.

Few farmers raise the strawberry, and fewer still raise enough for a full supply for family use. Such neglect is a burning shame, for they of all others may and should enjoy to the fullest extent this health-giving luxury.

RED AND BLACK RASPBERRIES

succeed the strawberry, and as they add greatly to the health and pleasure of the family, when freely used, they, too, should be grown by every farmer.

The Red Raspberry likes a cool and rather shady location and a rich soil.

The ground should be worked early in the spring, and a heavy mulching placed around each hill. It will be found very beneficial in a dry season.

I have found that three or four canes, for bearing fruit the following year, are better than a greater number. When three feet high the top should be pinched out; but, if not done at that time, it will be best to leave it until spring, and then shorten in one-third, and the laterals also. All suckers should be destroyed as fast as they appear.

Both the Red and Black Raspberry may be planted either in the spring or fall; but as the buds start early, I prefer fall planting. A shovelful of manure will be advantageously placed on each plant after setting.

THE BLACK RASPBERRY,

with similar soil and treatment, will do well. In pruning, however, the canes may be left four feet high and the laterals from twelve to sixteen inches long.

BLACKBERRIES

require the same soil as the raspberry. Six feet apart each way is the best distance for field culture; for garden culture, four feet each way will do. They will stand the drouth better than the raspberries, and do not really require as rich soil. The ground should be worked up to the time of fruiting. From three to four canes in a hill is sufficient, and when five feet high should be headed in. The laterals should be stopped when twelve to eighteen inches long.

The Lawton is, unquestionably, the best blackberry under cultivation, *when fully ripe*—possessing all the good qualities of that family. It is only half hardy, and requires protection through the winter. For family use I prefer it to all others after a trial of nearly all the known varieties.

The Snyder is perfectly hardy. It has stood the severity of the weather at twenty-six degrees below zero.

THE GRAPE

is, perhaps, the oldest fruit mentioned in ancient history (except the apple eaten by Eve). It certainly is one of the best of all the fruits, and may well be classed as one of the healthiest, and no farmer should feel satisfied with his home without a full supply for family use. With a proper selection of varieties we can enjoy this delicacy eight months in the year.

The grape succeeds best in a deep, rich, warm soil, and does not like clay even when well-drained. To secure a crop each year in this locality it should be pruned in the fall, and the vines laid down and covered with soil two or three inches deep. I have had good success by keeping the vines down with cord-wood.

CURRENTS

are so generally grown throughout the country that, I presume, all farmers know, or think they know, just how to grow them. The fact, however, is that after planting, the only attention they get is the plucking of their fruit, and I may safely say poor fruit at that. When properly pruned, manured, and the soil worked in the spring and weeds destroyed through the summer, the fruit will be doubled in size, and the quality will be found to be very much improved.

In conclusion, allow me to say that farmers generally do not appreciate fully the importance of a full supply of all small fruits for family use.

Mr. Bridgman asked if six feet was enough distance apart for blackberries?

Mr. J. Brown—Yes, ample with me.

Mr. Baldwin—Would you recommend the Lawton?

Mr. J. Brown—Yes, always for eating, where hardy. It is the best berry ever eaten. For hardiness, with little regard to quality, the Snyder is preferable.

Mr. W. A. Brown spoke highly of the Lawton as a market berry for Berrien county.

Mr. Chilson spoke of the rust destroying the Lawton about Battle Creek.

The discussion now turned toward insects, and Mr. J. D. Baldwin, said he had used coal-ashes about his currant bushes extensively with the best of results; he had never been troubled with the currant worm.

Mr. Guild corroborated this statement in the experience of people of his acquaintance.

Mr. E. W. Cottrell, of Wayne county, said his currants and gooseberries had never suffered from the worm, and he had also used ashes and salt around his pear trees, which so far had never been troubled with the blight. His trees, however were yet young, and that might have something to do with it.

Mr. Gibson believed there were certain elements in salt as it was made for fertilizing purposes, that were valuable in plant growth, but hinted that in all probability the influence of the salt was mainly in getting other elements in shape to be used by the plant.

President Lyon announced the following committees:

On Articles Exhibited.—W. W. Tracy and E. W. Cottrell, Detroit; Rev. D. R. Swoop, Hastings, and G. H. La Fleur, Allegan.

On Resolutions.—W. K. Gibson, Jackson; C. R. Coryell, Jonesville, and J. D. Baldwin, Ann Arbor.

The meeting then took a recess till 1:30 P. M.

Thursday Afternoon Session.

The first paper of the afternoon was given by Mr. E. M. Potter, of Kalamazoo.

BOYS, BIRDS AND BERRIES.

Three Bs! What shall I say about this interesting trio? Shall I tell you that after quite an extended observation I am fully convinced that boys are a very important factor in the problem of human existence? They will start out in business with less capital than any full grown man would dare venture with, and very soon accumulate a stock in trade which the shrewdest merchant of long experience could not sell in years.

Did you ever see a sharp, wide awake boy empty his pockets when trying to make a trade? First comes a broken jack-knife, then a peg top, two fish lines, a skate strap, a bean snapper, a bag of gravel stones, an old gun lock, a pair of bullet molds, a box of fish hooks, a few short slate pencils, a piece of red chalk, a circus show bill, a kite string, a dime song book, a whip lash, and about two quarts of marbles. I once heard of a man who took a great amount of pride in his three smart boys. The old man said they worked industriously

in good weather, and when it rained they would borrow his jack-knife and go out to the barn and trade that old knife among themselves until they had made fifty cents apiece and then come and give him back his knife.

It has always been a great consolation to me to know that the greatest and best men were once nothing but boys. And it should be a source of the greatest encouragement to the youth that this life is full of the grandest possibilities, and they should ever remember that the best and most useful men that the world has ever known, started out from this same stand-point. We can hardly realize the great change which may take place in a few years, either in their mental or physical characteristics, while passing from youth to manhood. We can look around us and often see persons of wonderful magnitude, who it seems incredible were ever held out at arm's length as they were admired by a fond and doting mother. But is it not a sad and fearful thought that the little innocent prattler in its mother's arms, or the rosy-cheeked lad in all the exuberance of youthful vigor, may yet be a curse to society, and possibly close his worse than useless life in a felon's cell? I believe that the surest way to ruin a boy is to give him plenty of money and nothing to do, and my impressions are that many, very many boys at school would turn out better in life if they were kept steady at work until they could more fully appreciate and improve their school advantages. While it may be truly said that "idleness is the mother of crime," it is also the imperative duty of parents and guardians to see that boys have not only proper recreation at the proper time, but also a good, moral training to influence their thoughts and conduct. I am acquainted with a good Christian mother who once was teaching her little boy to repeat the following: "A wise son maketh a glad father." The little fellow went about his play, and after a little while his mother overheard him saying, "A wise father maketh a glad son." "A wise father maketh a glad son," and my convictions are that this new proverb deserves a place in every parent's heart. It is well to encourage the children in earning money, and instruct them how to use it in such a way as will be of some real benefit to them. Pay them the same as you do other berry pickers, and let them buy their own school books, articles of clothing, etc.; it teaches them to be industrious, and to rely upon their own resources. I know a man whose acres far exceed his moral influences, who in the magnanimity and solicitude of a father's heart, gave his only son, a bright, intelligent boy, too much leisure, too much pocket-money, a pony to ride to the village school, and afterwards to the "business college," and how do you think he graduated? He "finished up" a short time ago in a "pet," just when his indulgent parents had anticipated solace and help from him in their declining years, and I venture to say that the "end" is not yet. Now this is not a solitary picture by any means. I presume, however, some of you are wondering what place a dissertation of this character has in a meeting of fruit growers.

I will tell you! Keep the youth employed about something useful, and one of the most ready means for its accomplishment may be found in the increase of berry plantations. When I see a boy wandering around aimlessly and wantonly, throwing stones at every little harmless bird, I feel that the future career of that boy is fraught with the direst consequences. Fire arms of every description are too cheap and plenty for the good of the boys or the safety of the community.

I cannot believe that the fruit grower and the birds should be enemies to each other. Supposing we could not hear a robin or brown thrasher for five

or ten years; at the end of that time how many berries would we be glad to give if we could only for once more listen to such a grand chorus as comes to our ears with the dawn of every spring or summer morning?

Shall I tell you that the birds give us the greatest variety of music, can get up the largest and best concerts on the shortest possible notice, will favor the most promiscuous company of listeners without regard to either age, caste or color, and no reserved seats, will begin their entertainments promptly at day-break with their grandest songs and no diminution in the interest of the programme until evening twilight?

Birds seem to give sweetest expressions of gratitude to their Creator, while man alone often remains unmindful of the many blessings which come on the wings of each new morning.

My impressions are that the birds do us more good than harm, still I give the robin credit for being able to tell a good cherry from a bad one. The other day my little four-year-old boy came in saying that the robins scolded and scolded him when he tried to get a few early cherries, but said he, "I guess they want them for their little baby birds," and he seemed perfectly reconciled.

Who can compute the number of harmful insects which the birds destroy for us every twenty-four hours, and much of this valuable service is rendered for us long before we begin our day's work?

Yes! I say let everybody who has even a garden patch plant berries. Let there be enough grown for all, including the boys and birds. But the all absorbing question and which meets us everywhere is, "What shall we plant?" I apprehend that the most common mistake is made in planting too many varieties.

Because some one can sell us a new and wonderful sort at a marvellous price, it is not always that we can "go and do likewise." I know some who invested in the "Mexican everbearing strawberry," at three (3) dollars for a dozen plants, and yet who shrink from discussing their merits, but are ever ready to "cuss" the man who "sold 'em."

I was not one of the lucky ones, but I have got a new raspberry which I might be induced to sell at cost if they don't exceed my expectations this season. The name even is costly, but I give it to you freely with all the attachments, "Pride of the Cornwall," "Three for a dollar." I know it has been said that the Wilson's Albany is the "lazy man's strawberry," but I happen to be acquainted with several who grow them, and this is all the evidence I ever had of their laziness.

The safest way for a new planter is to inquire of fruit growers in their own locality, regarding the best and most profitable varieties and plant only three or four of the best and well tried sorts.

Plant new sorts sparingly. They may do well in other localities with special treatment and come to you well recommended, and possibly after more extended trial prove really valuable, but there are very, very few varieties of any kind of fruit which will succeed well with such treatment as they will receive by the masses.

Another common error is made in planting on soils destitute of the necessary plant food. A soil rich in vegetable deposit, with a top-dressing of salt and wood-ashes, may be used to good advantage.

I will not attempt with my limited knowledge and experience to give a list of the best and most reliable varieties, but will merely say that the most com-

mon error is in lack of system and in attempting to do more than we can do well.

Mrs. H. Dale Adams said she was friendly to birds in general, but no one with her experience with cherries would take a great deal of stock in the robin or cherry bird.

Mr. Marvin said the little yellow birds had done a great amount of mischief for him. They evidently picked the strawberry to get the seeds, but in so doing destroyed the pulp. He had declared war upon them.

Mr. Baldwin used to shoot birds that took his fruit, but late years had decided that it was profitable to raise fruit for the birds as a premium on their valuable services.

Mr. J. Brown spoke very humorously of the discussion from year to year on the Wilson strawberry. He earnestly desired that the tastes of people could be educated to a higher standard than the little sour Wilson, and closed with an eulogy upon the Sharpless.

The discussion gradually drifted into a talk upon the relative merits of varieties, and the Rev. Mr. Shoop took exception to the maligning of the Wilson, saying that the majority of people would choose that berry in preference to any other when they were full and of good size, and if it was not for the deterioration of the Wilson towards the close of the season it would be the berry for him (the speaker) at least. Reference was made to the practice of killing birds on the farm, and the speaker did not approve of it as they were almost a necessity, and the amount of fruit destroyed was of small consequence to the good derived from their services in exterminating insects.

W. A. Brown thought that several varieties might be preferable to the Wilson for amateur and epicure cultivation, and for village markets. The growers for the Chicago market had tested every new variety, but all had been found lacking in one or more of the good qualities of the Wilson. The Wilson was the only berry which would bear re-shipping long distances from Chicago, and, though not so fine in flavor as some other varieties, no lover of the strawberry would refuse to eat strawberry short-cake made of good Wilson berries.

Mr. Jeremiah Brown stated that the Wilson berry sold for six cents in the Battle Creek market, while he sold the Crescent seedling for eight to ten cents, and the Sharpless for twenty cents. He did not see the use of cultivating cheap berries.

Mr. Marvin, of Ovid, said the society was one of progress as he understood it, and he did not intend to confine himself to the Wilson berry or any other; he wanted a better one and intended to have it, and, in his belief, any one cultivating the above mentioned berry for market would grow poor.

Mr. W. N. Cook, of Grand Rapids, wished to make a single statement in the discussion. When he left home the Shirts was selling on the street for 12½ cents per quart and the Wilson for 4c. and 5c. per quart.

Mr. Shirts said all he had to say of his own berry was that after carefully testing it along with other berries he had plowed up all the others and saved only the Shirts for market.

Mr. Lawton.—The plane of the Wilson is a good place to start for improvement. I like it, but have no prejudices in its favor. When we do get a better berry for all purposes the Wilson will drop out. I am waiting for the signs of the times.

Mr. George Bridgman stated that to judge of the Wilson berry it must be compared with berries that ripened at the same time it did. Could the Wilson be placed on the market in ripest condition it would be the favorite berry in

the world. But the time was coming when the people would demand a better berry than the Wilson, and when we have to send them to Chicago and sell them for five cents a quart, it was time to cultivate a better variety.

Mr. W. A. Brown, of Stevensville, said that in regard to berries for the western market, no variety was as good as the Wilson. There were several thousand acres in his county in berries, and almost all were the Wilson berry. In regard to the deterioration of the berry late in the season it was due to the continued use of the ground year after year without replanting.

Mr. Haigh, of South Haven, asked if the Marvin, Shirts and Sharpless had succeeded in Michigan in field culture, and was answered in the affirmative by several gentlemen.

Mr. Bridgman said that where one man might cultivate a berry in one place successfully some other man would fail in another place. Specimens of the Sharpless grown in Battle Creek were compared to some grown in Berrien county, the latter being much smaller and less perfect, in order to illustrate the fact.

The second paper of the afternoon was by Mr. F. S. Kedzie, of Lansing, upon the topic,

SCIENCE IN FRUIT-CANNING AND JELLY-MAKING.

The science of to-day furnishes reasons for the operations of yesterday. Men plowed, sowed and reaped without the slightest consideration for the conditions of nitrification, the chemical reactions taking place in the germination of the seed or the changes which occur during the ripening of the grain.

Although these reasons as furnished by science may not in every instance or in the majority of instances assist in the successful performance of these various operations, they show why the operation is necessary and answer questions which our ancestor may have puzzled his brain over as he followed the drag or hilled his potatoes.

In the topic assigned I shall endeavor to keep myself entirely on the scientific side of the question; leaving the other side in all its practical bearings to those whose education and acquirements make them at home over a hot stove; to whom the snap of a cracking can is music, and who consider the sizzling and smoke of "sugar on the stove" as a proper oblation to the household gods.

To preserve fruit in a condition fit for the table two things must be secured. First, the aroma or peculiar flowing property must to a certain extent be retained. Second, and still more important, fermentation must be prevented. The aroma or flavor of most fruits is sufficiently retained by the sugar used in canning, and it is upon this that we rely. Many fruits owe their palatability, however, not to their aroma so much as to a certain fresh taste or demulcent property which they possess. This property has never been successfully retained by canning, as the cooking necessary for the preservation of the fruit destroys it, as for instance canned strawberries.

Fermentation, the friend of the housewife in raising bread and making vinegar; her deadliest foe in souring milk and working her tomatoes put away for the winter, has attracted the attention of chemists and microscopists more than any other subject during the past few years. They have discovered that fermentation can only commence in the presence of atmospheric air or the free oxygen which it contains; that a certain degree of heat must be maintained, and lastly and most important, the presence of an organic germ by its growth

and development to act as the ferment. Since we know the conditions for fermentation we must in our canning processes aim to destroy as completely as possible these conditions. That is, exclude the free oxygen of air and either remove or destroy the vitality of the germs of destruction.

It is apparent that these essentials for protection against fermentation have been complied with by every housewife in all the successful canning that has ever been done, and that every failure can be traced to some neglect in fulfilling the conditions for preservation, such as the can leaking air, bubbles of air held between the pieces of fruit, or the temperature of the fruit before canning not being raised sufficiently to destroy the germs.

Science, while it has succeeded in pointing out the causes of both success and failure, has not given any great assistance nor improved the methods which have been in use for years.

Many preparations have been manufactured for the preservation of fruit in its natural state, and without the use of heat. One of these, Spear's Preservative Fluid, consists of one ounce of bi-sulphite of soda dissolved in a pint of water, and sold for one dollar and a half. It is claimed that one tablespoonful of this fluid will preserve a pint of fruit. The salt used in this solution, bi-sulphite of soda, acts in two ways—it destroys the fermentation germs and also absorbs the free oxygen of any air which may be present in the can and is thus converted from the bi-sulphite of soda, which is a comparatively neutral substance, into the bi-sulphate of soda, which has a cathartic action similar to Glauber's-salts. A solution of boracic acid has also been used with considerable success. This material acts only on the germs, preventing their growth and reproduction throughout the fluid.

Aside from these chemicals other methods have been used for excluding the germs floating in the atmosphere. The white of eggs has been kept for days in a fresh condition by placing in a bottle in which the air had previously been heated to a temperature sufficient to destroy the germs present and then plugging up the mouth of the bottle by a piece of cotton batting. The same principle is used by housekeepers in pasting paper over the top of jelly tumblers and jars of jam, to prevent their moulding.

JELLY MAKING.

As the green fruit approaches maturity a certain insoluble substance which gives to green fruit its hardness becomes by the combined action of heat, air and light, soluble, and the fruit is then considered ripe. In the ripening of fruits and the cooking of green and hard fruit, the conversion of the insoluble substance into the soluble explains the peculiar softening by which fruits of stony hardness become soft and melting, for instance peaches and pears.

If the ripening process be carried on until the fruit is over-ripe this soluble material is converted into an acid which is not capable of being gelatinized, being frequently the cause of trouble in making currant jelly. If the soluble substance, which is present in ripe fruit and caused by the chemist's pectine, be removed from the fruit and boiled for a short time the heat converts it into another entirely different substance which is insoluble in cold water and which sets upon cooling into a gelatinous mass and forms ordinary fruit jelly.

In boiling this expressed juice it has been converted from a comparatively neutral substance into an acid called pectic acid. By continuing to boil this acid it loses its gelatinous consistency, becomes soluble in water, and still more strongly acid; it is then called parapectic acid; boiling still more, this becomes converted into a stronger acid still,—the metapectic acid.

It will be seen then that, aside from the necessity of having sugar present in jelly to act as a preventive, it is also essential to counteract the taste of the acid which has been developed in the process of coagulating the juice of the fruit, and that by continuing to cook the jelly after the first transformation of the soluble juice into the insoluble jelly, we convert it again into a soluble substance which we can never again gelatinize, and also set free a still stronger acid.

Most persons in making jelly or canning fruit place the sugar in the kettle with the fruit or juice, and then boil the whole until the fruit is ready to can or the jelly seems ready to set. Right here a little science helps prevent this waste. Ordinary cane sugar by the combined action of heat and a free acid is rapidly and easily converted into grape or uncrystallizable sugar which has only 2-5ths the sweetening properties of cane sugar. To illustrate this fact, I took one hundred parts of ripe gooseberries, placed them in a porcelain stew-pan, added sufficient water to cover them, then placed twenty-five parts of sugar in the dish and stewed the whole until the gooseberries were cooked. In another dish I placed one hundred parts of the same sample of gooseberries, covered them with an equal amount of water and stewed them an equal length of time with the first sample, but neglected to add the sugar until the cooking had been completed and the stew comparatively cool, when I then added twenty-five parts of sugar to this sample. After the sugar had completely dissolved in the second dish I analyzed both samples, and found that in the first sample in which I had cooked the sugar with the fruit, half of the cane sugar had been converted into grape sugar, while in the second sample where the sugar was not added until the cooking of the fruit had been completed, only one-tenth of the cane sugar was converted into uncrystallizable variety or glucose; that is in the cooking of the sugar with the fruit there was a loss in the sweetening power of 30 per cent, while by adding the sugar at the end of the cooking process there was a loss of only 6 per cent from the conversion of the sugar. Another fact in this connection: by prolonged cooking of fruit with sugar not only is there a loss of sweetening power and flavor of the fruit, but, as already explained, the gelatinous substance is destroyed and this gelatinous material which serves to mask the taste of very sour fruits being destroyed the acid of the fruit is brought out to its fullest extent.

Many varieties of the plum contain as much acid as the cherry, but from the presence of the larger amount of the jelly-making principles in the plum, its acidity is not so apparent as in the cherry. Let the plums be cooked for a long time, thus destroying the gelatinous principle and the acid effect is at once brought out. By prolonged cooking with very acid fruits cane sugar can be converted entirely into grape sugar, involving a loss of 60 per cent of the sweetening power.

In conclusion allow me to suggest that although experiments in regard to the length of time necessary to cook fruit to insure its preservation, the use of both bi-sulphite of soda and boracic acid as preservatives, are subjects upon which little investigation has been employed, they are still subjects worthy of attention from pomologists.

Because the topic elaborated by Mr. Kedzie was so intimately connected with another upon the programme, discussion was withheld, and Mrs. Perry Mayo of Marshall read an essay upon

THE PRACTICE OF CANNING FRUIT AND MAKING JELLY.

With the era of canning fruit there came to the housewife a great luxury, and much hard, hot work, also a good deal of anxiety.

I well remember the many questions asked as to its feasibility: "Is it possible?" "Fruit as good as fresh all winter?" "How do you do it?" "I want to know," when some kindly soul on blessings bent would regale to her friends of the tea party where she had eaten it, how it looked, and how it tasted, and the manner of preparing it. Each tea partian went home full of the project. "John should buy her a can (you see they went carefully, for it was quite a new thing), and she would try and see if they could not have fresh fruit this winter. The said can was purchased, and another with it, the man being more provident than his wife. In the putting up process one can was broken, and in the course of a week there was a fizzing and bubbling of the other as fermentation began, and the housewife declared "she had no faith in the canning fruit business, for she had tried it and it was all a hoax." Another neighbor tried and succeeded; and did you ever know one woman to be outdone by another? Number one tried again and succeeded, and to-day her shelves are filled with all manner of fruits, after its kind.

It has taken several years to bring the canning fruit process to where it is to-day. And shall I tell you why? So few of us housekeepers understand the simple science of our own work. Cans would break, fruit would mould and ferment, some would be flat and insipid, and some like Hamlet's offense, rank, and smelt to heaven. But now quite a degree of success has been achieved. Whether it is destined to meet with greater success in the future, time will tell, or whether these improved patent dryers will eventually supercede it or not, I do not know.

Fruit that is gathered for canning purposes is frequently picked before it is matured. I think fruit should be fully ripe before it is canned, excepting peaches and pears, and these should be just as ripe as will bear handling. Berries of all kinds should be fully ripe, not over ripe—passed into the first stages of decay. They should be picked just as early in the day as the dew will allow; first, for comfort in picking; second, for success in canning.

As to the cooking, various are the ways that have been devised for this. One way that I have found very successful, is to put the fruit in shallow pans on the top of the stove, and only put enough in each pan that the fruit may not crush.

Another way that I frequently try with berries, is to fill my cans full of fruit and sugar, and cook in the cans in kettles of hot water. This is a very nice way, but slow and tedious, and somewhat disastrous to the cans, and quite as much so to your temper should your cans break in the water. The best plan I know of is steaming, not in a common steamer over a kettle of water, but in one of those patent steamers sold by nearly all our hardware merchants. These you can fill with your fruit and sugar, no water is needed, and when done you have plenty of rich juice. Your fruit will be as whole as before cooking. You can do a large or small quantity. It only occupies a small portion of your stove. The fruit retains its full flavor, none passing off in the strain as each compartment shuts tight. I think the greatest care should be exercised in canning to have the fruit perfectly healthful. I am sure a great deal of fruit is put upon the table that is not fit to be eaten. Fruit that has had an inch or two of mould upon the top, or, as it is termed, has "turned," such fruit is by no means wholesome.

I have been on the Viewing Committee at our County Fair for several years, and in the canned fruit department. While there I had a good chance to learn how this is done. I find most of the fruit there is not sweetened at all, and but imperfectly cooked in order to have it keep whole, and make a good show. Last year several cans bubbled over, and had to be removed, and on examination they were found to be not cooked at all, just put into cold water just for the occasion. Several years ago there was vended about the country solutions (of what I do not know), that were warranted to keep fruit without excluding the air or sealing. I remember only one of them by name, and that was Spear's Solution. I think I tasted some once that was preserved in this way, and though the fruit was whole and well kept, still the taste of the chemicals (for such I think it must have been) was to me very unpleasant.

I really wish there was more fruit canned, not just enough for company, but enough that it might be put upon the table three times in a day. Put it up for yourselves, for your boys and your girls. I think children have a natural craving for fruit. I have seen boys that would eat a good hearty breakfast in the winter time, then go to the cellar, get three or four apples, eat these before school time, then with a good generous supply of dinner, fill every pocket full of apples, take one in each hand, and start for school with a reluctant look at the fruit dish as though sorry they could carry no more. Better furnish them fruit than pay doctor's bills; better give them the fruit than have them steal it, for have it they will if it grows.

I wish there were more blackberries raised. You hear much in regard to strawberries, raspberries, and grapes, but so little said in regard to blackberries. You may ride for miles through this country and you will not find one farmer in twenty that raises enough for his own use. The beech and maple lands, the home of the blackberry, are getting every year farther and farther in the rear. To be sure along our highways you will find a few brambles, but not enough for a taste. I think them one of our best berries, and I am sure in some cases of sickness they are a good medicine, and I have hardly known a well person to refuse them. When the country was much newer than it is now, when Battle Creek contained only as many houses as you could easily count upon your fingers, when malaria, fever and ague, diarrhoea, and such diseases ran riot, the ripened blackberry was hailed as a panacea for all such ills. I have heard my dear grandmother say that during what she termed the "sickly year," when the squaws would bring the ripe blackberries, she always felt that they brought healing in their luscious sweetness. Raise blackberries, raise all kinds of berries. There is no excuse for any person who owns or rents enough ground for what can be called a yard, in not having fruit enough for his family.

Fill your cans, do it well, exercise the greatest care in preparing your fruit, have plenty of it; let it not trouble you that the fire is hot and the day still hotter. This is what brings the fruit to perfection. None of these luxuries come to us without work, and hard work, too. If not your labor, it represents some one's. Take care of the fruit that He who showers the rich blessings of His love upon us has given. With a variety of all kinds of fruit in our cellars, we may set a royal table all through the winter season.

Jellies! Does not the very name carry one back to childhood's days? To the glorious summer days when the very skies seemed golden? When our feet were bare and our cheeks were brown, and our hearts as light as the eider's down? Jellies! Who cannot taste the scrapings of the preserving kettle, smell the aromatic breath of fruits and spices that came from mother's kitchen?

Jellies from the ruby currant, the pale, transparent apple to the Ethiopic blackberry or grape? Who cannot remember the generous slice of bread with its liberal supply of jelly that was always given us when we were good? I have always thought jelly to be the combination of all that was good to eat. Fruit and sugar blended and moulded into one very toothsome whole. All that is not pleasant taken out, such as peelings and seeds, and only the life blood of the fruit left. It's beautiful to the eye and pleasant to the taste. Its very manufacture is delightful. The straining, skimming, simmering, bubbling, all tell of a peculiar pleasure, and when it jellies that is a pleasure known only to the practical housewife.

The quicker the jelly is made, the lighter will be its color and the better its flavor. The ripeness of the fruit has much to do with this. I have known over-ripe fruit, or even ripe fruit, to persistently refuse to jelly at all. It would be a beautiful syrup, but not a fine jelly.

Only the best sugar should be used; still I have heard old people say, to whom making jelly was a work of fifty years ago, that better jelly was made with maple sugar and the sun, than could now be made with granulated sugar and the best evaporators.

I have been astonished at our county fair to see what beautiful pale jellies could be made from our dark fruits, grapes for instance. One glass in particular that I noticed was labeled black grape jelly; it was as white as the whitest syrup, and almost as transparent as water. On inquiring of the lady who manufactured, she said it was made from a black grape, its proper name she did not know, and when asked how she made it so light colored, "Why," said she, "I squirted 'em." She had pressed the pulp from the skin and the result was a most beautiful transparent jelly. The word she used to tell me how it was done was more expressive than elegant; at any rate I learned by it exactly how she did it. I do not know that there is any kind of fruit that will not jelly unless it may be cherries. I have tried them, and though I could not make a firm jelly still the flavor was most delicious. I have known excellent jelly to be made from dried apples, though I never tried it.

If there is one thing I am thankful for it is that my home is in Michigan. We raise all manner of cereals and raise them to perfection. Ride now along our country roads and you will proudly say, "Michigan, my Michigan." And in all kinds of fruits that are adapted to this climate, that are pleasant to the eye or sweet to the taste, we run riot. Then, when the summer days are long, when the sun, rain, and air bring us fruits of all kinds, let us take care of them. Let us can, dry, and jelly them, that when winter comes we may carry the most beautiful part of the summer into the frost, snow, and sleet, for fruit speaks loudly to us of glorious summer days, bright with sun and beautiful with birds and flowers.

Mr. E. M. Potter said many people thought grapes could not be successfully canned, but he had done it and gave the recipe as follows:

To begin with, prepare a kettle of wax made of seven or eight parts by weight of rosin (according to climate) and one of tallow, melted and well mixed.

Take *ripe* grapes, Concordes are certainly the best for this purpose, pulp them and boil the pulps until the seeds can be removed with a sieve or colander. After which cook the pulps and skins together from one-half to three-quarters of an hour, or until the skins are tender, adding sugar to suit the taste. Use ordinary stone jars well glazed on the inside, or wide mouthed jugs.

Fill full and then wax the top edge of the jar and stretch over it cotton sheeting, tying tight by winding cord around the jar several times about an inch below the top. Then cover the cloth on the top completely with a thin layer of the hot wax, and soon as cool set away in a cold dark place and they will keep well.

For jelly the grapes should not be quite ripe.

Mr. W. A. Brown offered a resolution condemning the practice of putting up fruits in water for exhibition at fairs. This meeting with opposition which tended to provoke prolonged discussion the resolution was consequently withdrawn.

The next question was led by R. Haigh, Jr., of South Haven.

ORNAMENTING COUNTRY SCHOOL GROUNDS.

It requires but little observation to convince any one that there is much need of improvement in the management of our country school grounds, but I will not weary you with a tirade of reproach at the manifest neglect. We do not come here to criticize what is bad so much as to discuss and suggest methods of improvement.

That the subject has received careful thought and study from some of the best minds, the abundant matter in the last report of this Society bears conclusive proof, and the many excellent ideas there advanced I heartily commend to the consideration of all.

But it seems to me we should first consider the relation of this Society to the subject, and its duty and work. The relation and duty of the State Department of Education, the duty also of local societies, and our duty as individuals.

While the main work of the Society is the advancement of the material interests of horticulture in the State, it is also interested in whatever will advance the general welfare and the æsthetic and intellectual development as well as add to the pecuniary value.

While the ornamenting of grounds is directly a branch of horticulture because dealing with ground and plants, it may be made indirectly so an aid in education, that the relation of the State Department of Education becomes plainly obvious.

Local societies bear the same relation as the State Society only in a more limited sense, and we must not forget, as individuals, we stand on the same ground. The relationship is the same in all cases differing only in degree. Hence it becomes our duty as individuals, as societies, and as a State, to foster this as well as other means for our elevation, refinement and enjoyment, and I believe the first work of this Society is the suggestion and discussion of methods that shall tend to some practical result.

In beginning a building or the improvement of a piece of ground, the first work is usually the removal of obstacles, but it often happens that obstacles are found a good way below the surface and keep turning up all the time. So in this work of the Society, we must expect to meet obstacles all the way through.

The main obstacles in the way are the general apathy and indifference regarding it; the ignorance as to its value and the prejudice against it by many in authority.

Our first work, then, is to educate public sentiment; to bring the subject before the people, and excite general interest by papers and discussions.

This was so grandly inaugurated last year, that it needs no further mention here, except to urge a persistent continuance.

It is just here that we invoke the aid of the State Department of Education, and where its assistance may be almost invaluable. Our teachers need rousing to a proper appreciation of the subject, and I appeal to them to lend their influence. They have not lived up to their duty and privileges in this matter.

Local societies should take up the subject where the larger organizations leave it and in the same way carry it on and spread it abroad, and lastly individual effort should be unceasing in extending, emphasizing, and carrying out the suggestions of the societies.

If the State Department of Education will adopt a plan whereby our teachers will be instructed and stimulated; if this Society will continue its labors in the right way, seconded by the local societies and aided by earnest individual effort, a weight of influence will be exerted that will be simply irresistible. It seems to me, however, that this Society can go a step further in this matter. I believe a well-regulated system of prizes would be of great assistance in stimulating to active effort and the production of definite results. Papers and discussions serve to awaken interest, but without action no definite results are reached. I have no detailed plan to suggest for a system of prizes; that would be properly the work of a committee. But I think it would be a move in the right direction. Thomas, the doubter, has many representatives with whom no amount of argument prevails, and almost every one is better pleased with a practical demonstration. If we can adopt some plan whereby one school yard in a township will be properly ornamented, the end, so far as that section is concerned, is practically reached. If we can give these doubters an actual experience of the benefit and value of this sort of work, further argument will be unnecessary.

I trust I shall not be too wearisome if I venture a word of detail in the management of ground. All work should be done in accordance with a plan made and adopted before any work is begun. I do not make this assertion because making plans is part of my work, but because both observation and experience have taught me that best results cannot be otherwise obtained. While I would not say a word against voluntary labor and the ornamenting of grounds with as little outlay of money as possible, yet, I believe it a wise economy to incur some expense. As a rule, things are valued at what they cost, and if that is nothing, the thing is apt to be neglected, while an expense sufficient to put the grounds into a good condition at once will be respected and the work considered worth preserving. The plan should be made and work superintended by one who has some taste in that direction and who can give the matter some thought and study. The teacher ought to have ability in this direction.

In making a plan convenience should be first considered, after that whatever variety is compatible with simplicity and harmony. Walks can generally be brought from the street to the building by an easy curve, that shall not vary from a straight line enough to materially effect the distance, and a group of trees at the curve will make it appear necessary. Another group of trees may partially conceal the entrance and the two groups connected by a few specimen trees and plants. Only necessary walks should be made, and I would confine the ornamenting mainly to the front of the lot, leaving the sides and rear for play ground—wanting them only for shade. The play ground should receive some attention. I believe it may be made a source of instruction as much as

any part of the school. A little attention given to providing amusement here, will solve the question, how to preserve the ornamental grounds, much better than the attempted enforcement of such rules, though in this matter we do not give the scholars due credit for the observance of rules. I know in some recent work in Grand Rapids we have all been very agreeably surprised at the readiness with which the scholars accepted the new order of things, although it deprived them of a large portion of their play ground.

One of the main objections made against this sort of work is that it will not pay, and cannot be afforded, but considered in the right way as an influence in mental development, to say nothing of the purifying and refining influence, I believe it will pay largely, and should be considered a necessary expense as much as any other part of the school.

H. Dale Adams—Land is very scarce in our county. There is so little of it that only four or five people of my acquaintance in our immediate neighborhood think that more than one-tenth of an acre can be spared for school purposes. Here is where we must begin in the discussion of the subject of school ground ornamentation. We must get more land to be appropriated for school purposes. No school yard should contain less than an acre. Let this Society send out its fiat that at least an acre of ground in each district shall be devoted to the children, and I would like to see a great deal more. I would enjoy having the school yard the most attractive place in the neighborhood, and will ever stand ready to help make it such.

J. D. Baldwin said he had offered to give evergreens to school districts that would take the trouble to simply dig them up and transplant them, but no applications came.

S. M. Pearsall—The children are our hope, and we live for them—certainly we should not hesitate to grant them anything in this line that will be for their highest good.

E. M. Potter—When in a large number of school districts they only hold sessions of school long enough to draw public money, we have pretty poor material to work upon in order to secure the embellishment of the school yard. I confess I am not very enthusiastic, notwithstanding I see the crying need of effective work in this direction.

D. R. Shoop—I am wholly in accord with the spirit of Mr. Haigh's paper, and rejoice that our Society is taking hold of this matter earnestly. I should advocate even more territory for grounds than suggested by our friend Mr. Adams. Two acres is little enough to ornament and reserve a good play ground. Every school should have its gymnasium, and, in order to avoid gross errors, I would have the grounds laid out by a landscape gardener, that by and by, when the trees are grown up and the shrubbery fully developed, it will exhibit a prophetic eye in the arrangement. I hardly think it advisable to bring very many flowers or fruits in the yard, but let there be a wealth and diversity of evergreens and deciduous trees and shrubs.

Geo. W. Bridgman—I wish to put in a good word for the flowers. I believe they may be employed with excellent effect, not only for the outward adornment of the grounds but for inner embellishment of the school room, and there is nothing that can be used in the school room with better effect to awaken observation and develop analytic power in the young minds.

Mr. Haigh pleaded for some definite action by which there should result some influence with the educational department of the State.

Prof. Lawton—We cannot expect much from people who take no pains to ornament their own homes. Any good results in this direction must arise from

a wholesome public opinion. We must manufacture that. I know a district in which a very few interested people had to take advantage of a big horse race, when a majority of tax-payers were away, to get even a decent school house.

Mrs. H. Dale Adams urged that people go home from such meetings with a will to do something. She had a good deal of faith in the influence of even one person who was thoroughly in earnest.

Prof. Holmes spoke in general terms of praise of the action the Society was taking in this matter, and said the only way to succeed was to stick to it and never give it up. We have rare advantages in our State for developing ornamental grounds, and all are living below their possibilities. The school should be the center of public improvements and an example for private work of this character.

Secretary Garfield was called out and hastily ran over the history of the agitation of the subject in our Society, and advocated aggressive measures in the direction of our educators. He said not one-tenth of the teachers knew the names of the commonest trees used in ornamenting grounds, and not one in a hundred had a distinct idea of any proper method of beautifying a school yard. He had addressed a circular to a number of the leading educators in the State, inquiring their opinion upon methods of adorning school grounds, and with singular unanimity they agreed that they had no experience or opinions.

President Lyon thought that some work of education in this direction should emanate from the Normal School. They pretend to make teachers there who are to be models, who will build up model schools, and certainly this important part of their instruction should not be neglected. He strongly supported the view that aggressive measures were needed, and that we should keep the matter before the public.

On motion of H. Dale Adams a committee was selected to take the matter into consideration and report a resolution looking toward definite action on Friday. President named as such committee Messrs. H. Dale Adams, Galesburg; C. D. Lawton, Lawton; W. W. Tracy, Detroit.

The topic of

FAIRS FOR AMUSEMENT AND INSTRUCTION

was to have been led by Mr. J. P. Thompson, of the Post and Tribune, but the serious illness of that gentleman prevented his attendance, and Mr. A. C. Glidden was called upon for remarks.

Mr. Glidden said that in the matter of fairs we were not up to the highest standard yet, although they were accomplishing a good work, still oftentimes the definite object of making them instructive was often lost sight of by the managers.

R. F. Johnstone said that the first thing to be considered was a sound financial basis. The indifference of many towards horticultural displays at fairs was deplored, and the necessity of educating the people by the same careful display year after year suggested. The fair was particularly beneficial in view of the opportunities for competitive comparison in fruits, and careful consideration should be given to the subject.

Mr. Tracy spoke of ex-Secretary J. P. Thompson, of Detroit, who was suffering from a severe illness and unable to be present, although deeply interested in the welfare of the society.

Mr. R. F. Johnstone moved that in view of Mr. Thompson's services to the Society a memorial resolution be prepared to express the gratitude of the asso-

ciation, which was unanimously adopted, and a committee was appointed to draw up the resolution, consisting of Prof. Holmes and Prof. W. W. Tracy, of Detroit, and Mr. R. F. Johnstone. The meeting then took a recess until 7:30 P. M.

Thursday Evening Session.

A choir led by Prof. J. E. White opened the exercises with delightful music and rendered a number of fine selections during the evening.

The committee to whom was referred the matter of decorating school grounds reported as follows:

REPORT OF SCHOOL GROUND COMMITTEE.

In view of the neglect of school grounds throughout the state, and of the educational value of flowers, foliage, and general horticultural ornamentation, as well also with the view to secure the increased comfort of our children, the State Pomological Society earnestly suggests to its members, and to all good citizens of the state, that they endeavor to awaken public attention to this matter, and improve every reasonable opportunity to reform public sentiment to the extent that in due time our desolate, neglected school yards shall become places of beauty; shaded and ornamented with trees and flowers. And with the view of securing the active labor of teachers to this subject, we invite the attention of the officers of the University, Agricultural College, Normal School, Superintendent of Public Instruction, State Board of Education, and all other educational institutions, especially those engaged, wholly or in part, in training teachers for our elementary public schools, to the important subject of ornamenting school grounds, and respectfully ask that they coöperate, and unite their efforts with the efforts of this society, to secure public attention to the matter, and the proper public sentiment in its favor.

C. D. LAWTON, }
H. DALE ADAMS, } Committee.
W. W. TRACY, }

President Lyon was next called upon to address the society on the subject:

A FEW APPLES THAT ARE GOOD TO EAT, AND WHY.

A few days since a missive from our sometimes facetious secretary reached me, containing certain matter, out of which, as he announced, he proposed to evolve the programme for this meeting. Among these was the rather cabalistic expression placed at the head of this paper, with the accompanying request that we would prepare a short paper to introduce the discussion. Such a request from this source, as we understand, is to be construed as a command, and we, as in duty bound, sat down with Downing, Thomas, Barry, and a long array of nurserymen's catalogues. Commencing at the head of the alphabetical list, we came first upon the noted Russian, Alexander; but as this is hardly eatable till well cooked and seasoned, and as few of the consecutive varieties seemed any better adapted to the requirement, it seemed necessary to start on another tack.

Reconsidering the matter, our next thought was to select in the order of maturing. This brought us first to consider the Early Harvest, and to our apprehension, it would pass muster as "good to eat;" but, reflecting that some people condemn it, and that this may be assumed as a reason for distrusting

our subject, "Why?" We were thus brought to consider what we had undertaken to do. We would find it comparatively easy to give a tangible reason why an apple is or is not good for market; or why it is or is not good to put aside for winter; or even why it is or is not good to cook; but to tell why we consider it good, bad or indifferent to eat seems quite another matter. We have occasionally heard our worthy secretary say he thinks a great deal of his wife, and I doubt not he really does so, and with the best of reason; but we doubt if he would not find himself at a loss to give reasons why his preference ran just in that view rather than any other. But, humor aside, our likes and dislikes are a matter of taste or fancy rather than reason; hence the best and only real reason we are able to give why apples are good to eat is that we like them; and since tastes will differ, each variety must stand or fall by the general verdict; or rather, perhaps, by the verdict of experts. Moreover, with the differences of individual preferences, and the varying tastes of the same person under change of circumstances, it will hardly suffice to supply a set of consecutive varieties, such that but one variety shall be in season at the same time. The taste demands and should have a choice of varieties, as far as practicable at any and all times.

Judged upon the basis thus laid down, the Early Harvest must be accepted as one of the apples "good to eat"—if for no other reason, because it stands almost alone in its season; so that, for a time at least, it is that or nothing.

Carolina Red June follows the above very closely, and continues for some time later than the preceding. It will, also, sometimes mature a few fruits in advance of the Early Harvest; and, were it not generally so small, imperfect and scabby in this, its northern limit, it might very possibly even take precedence of that old favorite, to which it is decidedly superior in flavor.

Early Strawberry, which follows closely upon the disappearance of Early Harvest is one of the most beautiful of early amateur apples; and, although the flesh is not very tender, its high piquant flavor and abundant juice, together with its long continuance in season render it exceedingly desirable.

Summer Rose is nearly of the same season with the preceding; but is quite its counterpart in both the habit of the tree, and the appearance and quality of the fruit. It is really good enough either to look at or to eat.

Primate follows Early Harvest quite closely, and covers the entire season of the last two. Tree strong, productive and hardy, but sometimes water-cored when overgrown. It ripens in succession. The flavor is rather too mild for some tastes, but rich and very pleasant.

Early Joe, among apples, is nearly what the Seckel is among pears, of the standard of excellence. Much like Summer Rose in size, form and beauty of appearance, it quite excels it in quality, texture and flavor. Its season in Southern Michigan is early September. The tree must have high culture.

If sweet apples are to have a place in this connection, we may name the Large Yellow Bough, which will possibly come in just before the Early Joe. It is the best very early sweet apple although lacking productiveness.

Garden Royal follows Early Joe very closely. It is one of the "apples that are good to eat," because all that taste it, like it. The flavor is mild but rich; much like that of American Summer Pearmain, though possibly a little richer. The fruits are always perfect and very even sized; tree small; should be better known.

American Summer Pearmain is a mid-September apple, exceedingly beautiful and excellent when perfect; and so tender and crisp that it frequently our own conclusions; we find ourselves face to face with the latter clause of

breaks open when falling from the tree. Fruit often scabs and cracks on old trees.

Summer Sweet Paradise, is one of the finest of the large sweet apples; in season during the most of September. Lacks productiveness.

Scarlet Pearmain is one of the richest and most beautiful of September apples. Lack of productiveness is almost its only defect. No amateur's orchard should be without it.

Mexico is similar in season with the preceding and is fully its equal in every gustatory quality; although, in both flavor and coloring, as unlike it as possible. Both are alike excellent, although this excels in productiveness.

Gravenstein is almost too well known to require mention. Its rich, beautiful red color, and high flavor, are exceedingly taking to the observer; and it only lacks productiveness to render it popular even as a market fruit. As it is, it holds an intermediate place between market and amateur varieties. For the dessert it is too acid until fully ripe.

Chenango Strawberry is one of the finest and most delicate in texture of the larger mid-September apples; and its great beauty, juiciness and mildness give it a high rank among even dessert apples. Although less rich, it is even preferable to Late Strawberry.

Hawley has no superior in flavor among the very large mid-September apples. Its exceeding delicacy of texture unfits it for marketing abroad; but during its very short season, it can hardly be excelled as a dessert apple.

Jefferis is a medium, striped, bright colored and excellent dessert apple, for the latter part of September and early October. Boys are unerring judges of quality in fruits; and they award this the meed of excellence.

Jersey Sweet, as an early sweet apple, is hardly equalled by any other in high, rich flavor.

Dyer (Pomme Royal), as an early October apple, can hardly be called very attractive in appearance, but in consideration of its texture and high flavor, it must be accorded very high rank as a dessert fruit.

Newtown Spitzenburgh, sometimes known as New York Vandevere, is one of the very finest of early and mid-winter apples, when grown in perfection; but it often becomes scabby and imperfect on old trees.

Fall Pippin cannot yet be ignored as an amateur fruit, as nothing has yet arisen to take its place. Among the very large fruits it still stands first in quality; although sometimes scabby and imperfect, as well as deficient in productiveness.

Melon has hardly an equal among the larger, early and mid-winter apples. In beauty, delicacy of texture and excellence of flavor it is unexceptionable.

Shiawassee Beauty is "to the manor born." With all the beauty, delicacy of texture, and juiciness of Fameuse, and with the same whiteness of flesh and mild aromatic flavor, it seems to be, to a great extent, free from the defects that so diminish the value of that old favorite.

McLellan is a very beautiful and excellent mid-winter apple, always perfect and quite even sized. Perhaps somewhat lacking in productiveness.

Hubbardston Nonsuch, in New England, where it originated, is considered to be one of the best of winter apples for the dessert. We know no reason why it should not stand equally high in Michigan. In size, beauty, fairness and flavor, it is unexceptionable.

Belmont is an exceptionally beautiful winter apple, and possesses an array of desirable qualities seldom excelled. Although not of rich or high flavor, very few varieties prove more generally acceptable in this respect.

Jonathan, although not to our apprehension of superior flavor, is exceedingly beautiful, with great delicacy of texture and abundantly juicy. We fancy its quality frequently suffers from its excessive productiveness.

Westfield Seeknofurther seems to be waning in popularity, possibly from lack of productiveness. Whatever the cause may be this is to be regretted, since its rich, mild flavor and satisfactory general qualities render it highly valuable as a home dessert fruit.

Northern Spy is the king of the orchard, so far as the tree is concerned, and if by any fatality we were compelled to choose a single variety for the supply of our own wants it would beyond doubt be this. Its chief drawback in our climate is its excessive tardiness in coming into bearing.

Lady Apple (*Pomme d' Api*) has long stood high in eastern cities as a fancy apple, commanding very high prices. Its success in Michigan, so far as profit is concerned, may be doubtful, but we would not be content without a tree or two for the supply of our own table, as, for the special purpose to which it is adapted, there seems to be in reality no proper substitute.

Pomme Gris only needs to be known to be appreciated. For the amateur it has no superior, if indeed we have its equal in all respects.

Esopus Spitzenburgh cannot well be spared. Although comparatively unprofitable, every lover of the apple should give it a favored spot and strive to win from it a supply for his own table.

Wagener is good enough to eat, if well grown, and the tree not permitted to overbear, but both size and quality are usually injured from the excessive productiveness of the tree.

Swaar is another of the older eastern varieties which will only succeed with us in favorable soils and with good cultivation. When well grown it is so excellent that its needs should be studied and provided for. No other variety, whether old or new, can fully supply its place.

Lady's Sweet has no superior as a long keeping winter sweet apple.

Paw Paw (Rubicon) when successful is really excellent, and where it does well we consider it well worthy of being planted on a scale adequate at least to the home want, as it keeps very late in spring. It seems to require a rich, warm, quick soil.

Red Canada cannot be called a rich apple; but its mild, pleasant flavor, with its abundant juice and fine aroma; as well as its ability to retain its qualities till very late in spring, render it indispensable to the amateur.

Golden Russet has all the good qualities of the foregoing, except that it, in common with all russets, rapidly shrivels upon exposure to the air, but, if put up in close packages, it retains its freshness. It has few equals in richness of flavor, when properly kept. Few, if any others, equal it as a long keeper.

Prof. Holmes—I notice that an old favorite of mine is left out of Mr. Lyon's list; a variety that one can eat of all day long with no injury and still have a keen relish for more. I refer to the Snow apple.

Mr. Lyon—Prof. Holmes may have noted that I spoke of the Shiawassee Beauty, which has all of the good points of the Snow apple, and is not as yet attacked with the black fungus that is so liable to disfigure the Snow.

J. D. Adams—We have too many varieties of apples for our own good. If a list of ten varieties were made, we could afford to lose the rest. Our orchards are lumbered up with useless varieties, that are neither good to eat nor to sell.

A number of gentlemen urged in reply that we could afford to have our family apples indefinitely extended in numbers, but market sorts were to be placed upon a different footing—the fewer the better.

Mr. W. W. Tracy followed this discussion with an informal conversational address as follows, upon the general topic:

PRACTICABILITY OF AESTHETIC CULTURE.

In the very beginning of the history of our race the edict was given, that henceforth man should live by the sweat of his brow, and ever since then he has been striving to escape it, ever trying to find some way to live without labor. Has he succeeded? The regular click, thud, of the spinning jenny as it moves backward and forward doing, under the guidance of a single hand, that which formerly required an hundred, and not only that, but doing it better than they could possibly do it; the clitter clatter of the mowing machine as it sweeps down in a few moments broad acres that formerly required days of most laborious toil; the busy hum of the sewing machine, heard now in most of our homes, all answer Yes; but the weary, tired look on the faces of the thousands of operatives who pour out of our mills at night, after their ten, twelve or fourteen hours of labor, the hurry, the drive, the overwork of our farmers, which is ten-fold greater than that their fathers knew, and saddest of all, the constant demand upon the time of our wives and mothers, which so often prevents them from doing more than barely getting acquainted with their children, all give a far louder negative answer. And this *must* always be so, for he who gave that edict was not a man that he should lie, or the son of man that his words should come to naught; and whatever man *might* have been, he *is* so constituted that no sooner does he by his wit or wisdom contrive some plan by which he can do in one hour the labor that formerly required an hundred than some new want or desire, the gratification of which seems absolutely essential to his comfort springs up to demand the labor of the remaining 99. The great question then is, not how to escape labor, since that is impossible, but how to get the greatest amount of good from our labor, and in answering it we must remember that man's physical wants, those which he has in common with the brutes must first be supplied, but that every man's labor is more than enough to secure this, and it is with this surplus labor only that our question has to do. We can scarcely do better than to look for a moment how this labor *has* been expended in the past. We read in the book written by the ancient Assyrians on their palace walls of sculptured alabaster, of a people fierce and warlike in character,—a people who could make it their recorded boast that they made piles of the ears of their captured enemies, pyramids of their hands and mountains of their heads. Surely this cannot be said to present a favorable picture of the æsthetic culture of their times; yet in the ruins of the cities, which after lying buried for ages are exposed by modern research, we find so much of beauty and grace that men familiar with all the elegancies of modern life could only exclaim in astonishment—here is very wantonness of ornament and beauty. Ancient Rome was so full of painting and statuary that they tell us the modern city is built of the broken fragments of sculptured marble that formed the ornaments of the ancient; and Prescott has no more eloquent words than those in which he describes the gorgeous robes of humming-birds' feathers worn by the kings of the ancient Aztecs, and of the profusion of graceful ornaments found on all their works. We are certainly speaking within bounds when we say that if we may judge by what they have left us, fully one-half of all the labor of the past has been expended for the sake of the beautiful.

But ours is an utilitarian age, and in it, among our busy, hard-working,

money-loving people we shall find no such foolish waste of labor merely for the sake of appearances! Perhaps not; but I do not know that this room is particularly ornate in character, nor that this audience is particularly overdressed, yet I am sure that were we to utterly ignore appearances, a room affording every physical comfort of this, could be built for half the money this cost, and I know that were it not for pleasing the eye, we could all be as warmly and comfortably clad in clothes that cost less than half the labor put upon those we wear. Some of us know that however much of poetry there may be in the sound of the mower whetting his scythe, in the actual use of that implement there is little else than the most unromantic toil. Yet, even this tool destined to be so rarely seen except in the hands of the workman must receive its coat of brilliant paint or its gilded band. Do they add anything to its strength or usefulness? Do they serve any purpose except that of pleasing the eye? No; there is scarcely a thing that man uses from his cradle to his coffin, but that a large share of the labor expended upon it is for the sake of the beautiful; and it is true now as it always has been, that fully one-half of all man's labor beyond that necessary for his mere physical comfort, is expended for the sake of pleasing the eye.

But what constitutes beauty, and where do we find it? Ask the painter, and he will tell you it rests in the purity and brilliance, the contrast or harmonious blending of colors. But has the artist lived who could present more vivid contrasts, more harmonious blending, more depth and purity of color than are found in the flowers we see all around us?

Ask the sculptor and he will tell you that beauty lies in the easy, graceful flowing of line into line. Are there any more perfect examples of these than are found in thousands of the plants and trees in every field and forest? Is it not true that the most perfect examples of beauty in all its elements are found in boundless profusion in that grand kingdom which God has created and used to decorate his handiwork? And yet the world, after admitting, as it does by the way it expends its labor, that there is no one thing which gives greater enjoyment than beauty, says of the men who, like a Brown or a Thoreau spend their lives in learning day by day to appreciate and enjoy more and more of the wonderful, marvellous beauty God has spread out before us, "He is an impracticable fellow—his is a wasted life." While of him who never raises his eye to all this beauty, but spends his time and energy in the accumulation of wealth, which, when at last as old age creeps in upon him, he can only spend in building some marble palace surrounded by beautiful grounds, and finds, alas! that it is too late, the eye has grown dim, the heart weak, and he can find no pleasure in it all—it says of such a man, he is shrewd, he has done wisely; when he in all his life has enjoyed less of that the world works for than the despised, impracticable lover of nature has in a single hour.

God has sent us into the world with an appreciation and natural love for the beauty He displays in all His works. Have we any more right to allow this faculty to go undeveloped and to ultimately perish from want of exercise than we have to treat any other faculty in a similar manner? A few months ago I found in the woods of Northern Michigan a settlement of deaf mutes, consisting of three families with several children, all but one of whom were also deaf mutes, and this one growing up with his companions, and never mingling with others, was supposed to be like them until a few months before I saw them they had been visited by a relative, who discovered that the child could hear, and that there was no natural reason why it should not talk, and in a short time succeeded

in teaching it to do so. What should you think of those parents if they, not knowing the full pleasure of that faculty should take no interest in its development in their child? Would you not be indignant if they not only neglected doing this, but even threw obstacles in the way of its development? And yet in your own town, possibly in your own household, are children growing up in whom all appreciation of the beautiful lies dormant and undeveloped, and the parents not only do nothing for its development, but oppose every attempt to do so on the part of others, and say that no part of the public money can or shall be used in trying to teach the children to love the beauty that is spread out before them. You say all children have not this faculty. If you could have seen my boy rush across the garden crushing the flowers I had tended so carefully, you could but admit that he at least was destitute of it. Perhaps so, but do you remember when that boy was in your arms how he reached out his tiny hands with a cry of delight for the pretty ribbon at your throat? He was met with, "Tut! tut! musn't touch!" Do you remember that summer evening, when for the first time he was put upon the lawn, how he crept to that same bed of flowers and cried in his eagerness to get them? Wasn't he snatched up with, "Johnnie musn't?" Do you remember a little later how, when he came rushing in with muddy feet and torn jacket crying, "Oh, mother! see what splendid flowers I've got!" was he not met, "Oh, Johnnie! just see how you have tracked all over the carpet, and how you look!" A sad, sad thing that the beautiful carpet should be soiled, but a little thing that the child's appreciation and dawning love of the delicate beauty of the Anemone or the Hepatica, which he held in his hand, should be crushed out. Is it not possible that his inborn truthfulness prevented him from understanding why the gorgeous flowers of the carpet should be so carefully guarded while the far more brilliant and delicate ones he held should be so lightly prized, and with the natural tendency to undervalue that which he could not understand, a contempt instead of a love for the beautiful in all things should be planted, which has gone on developing until now?

I am by no means a childless bachelor, and I know that baby fingers would soon spoil the pretty ribbon, but I claim that the very eagerness children always display for such things shows that they are born with a natural love and appreciation for the beautiful. They must be if made in God's image, and I believe that although it does cost us something of trouble yet, still, we are in duty bound to try to develop this good element in their nature as well as any other. And I think that there never has been a subject discussed in our Society of more importance to the future welfare of our State than just this one of ornamenting our country school houses, and I hope the Society will not drop it until every school yard in all our fair State is a thing of beauty, a joy and pride, not only to the children but to all in the district.

Following Mr. Tracy, Mr. Haigh and President Lyon warmly endorsed the sentiment of the address.

Mrs. Mayo spoke on behalf of farmers' wives, she believing that they should take time each day from their duties and devote it to educating their children and to making their homes pleasant.

Senator T. W. Palmer, of Detroit, was called on, and made a few felicitous remarks, stating that he could concur with Mr. Tracy on his views of the æsthetics of life. The speaker said much has been said about European refinement and culture, but he thought that America was favored above other countries in that respect, yet he would heartily concur in any scheme for the advancement of æsthetical culture in the homes and elsewhere.

Prof. J. C. Holmes gave some illustrations of progress made in the adornment of farms and homes, and consequent development of truer, nobler views of life and its purposes.

Mr. J. D. Adams, of Climax, gave a chapter from his own experience in hewing out a home as a pioneer, and of the satisfaction which he enjoyed now in gathering about his home in the form of buildings, trees, etc., that which made him proud of his farm home.

Adjourned until Friday morning.

Friday Morning Session.

RESOLUTIONS OF SYMPATHY.

The committee to whom was referred the matter of preparing proper resolutions to be sent to Mr. J. P. Thompson, reported the following, which were unanimously adopted by a rising vote:

WHEREAS, This society has heard with deep regret that Mr. J. P. Thompson, of Detroit, is suffering from a severe illness, preventing his attendance on this meeting and society in which he has taken so warm an interest and has been so valuable a member; therefore,

Resolved, That we tender and express our sincere sympathy with Mr. Thompson in his severe illness, and trust that he may recover at an early day and resume his accustomed place in the society; and, furthermore,

Resolved, That a copy of these resolutions be forwarded to Mr. Thompson.

The Committee on Exhibit, through Will W. Tracy, Chairman, made the following report:

MR. TRACY ON THE STRAWBERRY EXHIBIT.

LADIES AND GENTLEMEN OF THE MICHIGAN POMOLOGICAL SOCIETY:—The committee on fruits exhibited would preface their report by a statement of some of the conditions which make this report less valuable than would be expected.

First, the season was so much earlier than usual that in many sections, including most of those where the strawberry is largely grown for market, the crop was fairly passed, and it was impossible to get fine samples of many varieties. Again, in addition to the above, there had been so much rain for a few days preceding the meeting that many of the berries were of very uneven quality, there frequently being more difference between individual berries on the same plate than between those of distinct varieties. So your committee were unable to make a discriminating report on this feature of the exhibition.

We think that most people would award the palm for beauty to the Sharpless, of which there were several fine plates, one of particularly large and fine berries, being from Mr. J. Brown, of Battle Creek. Yet we fear that when *shown in the market* by the side of the much abused Wilson its color would be against it. Again, the variety as shown here certainly lacks shipping qualities, not only bruising easily but rapidly spoiling whenever the skin or pulp is broken. *The Marvin* seems to be a much more even berry, and it seemed to the committee that their average weight would be nearly if not quite equal to the Sharpless. They were of a uniform color, and although picked 48 hours before the Sharpless, after both had been on the table 12 hours, presented quite as fresh an appearance. The *Shirts* seems able to stand up under any amount of hard usage. The samples shown were picked Monday morning after a hard

rain, and while still damp were packed in the ordinary way and shipped 100 miles to Battle Creek. Arriving there they were exposed to the full rays of the sun for five or six hours, and then placed in an ice house for 12 hours before appearing on the tables Thursday morning. Yet they stood up perfectly well, only showing signs of spoiling about Thursday noon, and good berries could be found as late as Friday noon. We certainly think that these two Michigan seedlings are well worthy of trial, for they certainly equal if they do not exceed the Wilson in ability to stand rough usage, while they are handsomer and of better quality. Among the other varieties exhibited were Champion, Cumberland Triumph, Kentucky Seedling, Centennial, Great American, Cinderella, Monarch of the West, Capt. Jack, and others, but none of them compared at all favorably in beauty with the Sharpless, the Marvin, or the Shirts. Mr. G. W. Bridgman, W. C. Babcock, Mr. Ambrose F. Wight, and others deserve the thanks of the society for their efforts in presenting their collections. Fruit men will understand how much courage it takes to go into a patch which is far past its season and pick out a plate to put on exhibition, yet it was just this that these gentlemen did in their desire to make our meeting a success. Among other articles exhibited were a whiffletree protector, by Mr. Marsh, of South Haven, and five samples of fruit packages shown by Mr. Follensbee, of Muskegon. An earnest of what our future spring meetings may be, were a few fine vegetables from the gardens of N. Chilson, of Battle Creek, who thus sets an example which we hope will be largely followed in the future.

Report was accepted, adopted and ordered transcribed in the minutes of the meeting.

Mr. Wm. A. Brown offered the following, which was adopted :

Resolved, That this Society appreciates the efforts put forth by Messrs. Marvin and Shirts in the production of the two new varieties of strawberries exhibited here, bearing their names, and consider from the appearance of the berries as exhibited here and at Muskegon one year ago, that we have in both varieties valuable acquisitions to our list of strawberries for this state.

The Society next listened to a paper by S. B. Mann.

REPORT OF DELEGATE TO OHIO SOCIETY.

Mr. President and members of the Michigan Pomological Society: Custom would require of me a report of the proceedings of the meeting of the Ohio Horticultural Society, at Canton, on December 10, 11 and 12, 1879, to which I was sent as a representative of this society.

First, then, allow me to thank you for the honor conferred upon me in being selected from among so many older Pomologists to fill so important a position.

Ohio, as a state, does not put forth claims of being a great fruit growing state, but taken all in all, she is one of no mean proportions, and some of her citizens have a national reputation, second to none in the country as Pomologists.

The honored and venerable Dr. J. A. Warder, president of the Ohio society, is too well known to fruit men of the world to need an introduction at my hands here. The same may very truly be said of Secretary M. B. Bateham. I had also the honor of meeting there many more of the able and energetic fruit growers of the state, such as Mr. N. Ohmer of Dayton, G. W. Campbell of Delaware, G. M. High of Kelley's Island, and very many others. I also had the pleasure of meeting Mrs. Helen V. Austin, the delegate sent there by

the State Society of Indiana, who favored the meeting with a very interesting and well prepared essay on "Women as Horticulturists."

The essay of Mrs. J. K. Neisz, of Canton, on the Influence of Horticulture on Rural Life was exceedingly fine and drew out much applause.

Some of the topics discussed were very interesting, and the conclusions important. With the hope that I may not make this too lengthy, I will venture to give a portion of some of the most important topics discussed. The "black knot" seems to have interfered very seriously with the culture of the plum and cherry in Ohio.

The black Morello cherry and the Damsons among the plums were especially the sufferers from this pest to a very alarming extent. Secretary Bateham took the initiatory in this discussion, and said it was a fungus growth and assumed the most activity during the months of June and July.

The powder-like spores were thrown off at that time and carried by the wind to new lodgements, where it again commences its work of destruction on the bark which begins to swell into a knotty shape, and as the season advanced it hardened and turned black.

The remedy given by the speaker was to cut away the branch as soon as discovered, but if not, before the winter would expose the knot to view, when all affected branches should be carefully cut away at some distance below the knot and burned. But far the safest way was to attack it vigorously before the season of its greatest activity began.

The cabbage worm was reported as on the increase, and the consternation depicted on the countenances of some of those old Pennsylvanians—who have appropriated the most of southwestern Ohio—as they discussed the future prospects of their sauerkraut was pitiful indeed, and every syllable uttered as a possible remedy was eagerly listened to. Among other remedies was an ounce of carbolic acid in two gallons of water, sprinkled over the cabbage. One old veteran in the war of extermination, said that wood ashes and dust from the road sprinkled on the cabbage would drive them off. Another had used hot water of 150° applied to the cabbage with splendid success. But the general belief was that catching the moth and destroying it was the most reliable method of relief.

The grape rot was another topic that brought out very earnest discussion, and really is alarming the grape growers of Ohio. Secretary Bateham said it was one of the most trying to the fruit growers of Ohio of any of the calamities they had to contend with. Thousands of acres of vineyards had been grubbed out, and the loss was immense. He had given it very much attention and believed it was caused by atmospheric influence. It was not the soil nor an insect, but a fungus growth. Very much rain in June and July, with warm, muggy weather, was sure to be followed by grape rot. It followed the track of thunder storms.

The reason the island vineyards had escaped so well was that there was less rain fall and no dew at all, and a pure atmosphere. Too thrifty vines might be another cause. The remedy must be sunshine and a drying atmosphere. Another was paper sacks tied on the bunches of grapes, and here Dr. Warder suggested the saturating of the paper bags with sulphurous acid gas as being an excellent help, or the sprinkling of dry sulphur on the grapes would do as well. The spores appeared to attach themselves to the tender skin of the fruit and feed on its liquids, which might have led to the theory that it originated in the sap.

Mr. High, an extensive grape grower on the islands, said there was never any dew on the islands.

The Chair replied that he had noticed that fact, and that even notes scarce ever became due over there.

Mr. Ohmer said there was a theory offered that tomatoes planted among the vines would prevent the rot.

The codling moth, curculio and canker worm all received due attention, with much the same remedies given as those at our own meetings.

The science and practice of pruning was the title of one of the first papers read before the society. Mr. G. H. Miller, of Norwich, was the author. He illustrated his points by the use of a number of nursery trees which he cut and pruned both in top and roots, before his large class of attentive listeners, in a manner that showed him to be no novice at the business.

He was followed by Mr. G. W. Trowbridge, of Glendale, who gave an illustration of the method of a friend of his, who claimed that the buds of a tree grew in circles, and the theory was to cut the young tree back at planting time, so as to leave only three buds to grow for the future top, and that this would be the only pruning the tree would require except, perhaps, sometimes a stray shoot that started out towards the other limbs and marred the beauty of the top.

The question was raised as to whether some varieties of trees would not split down when loaded with fruit with a top of that kind, to which he replied that practice had proven the contrary to be the case, and that the tree actually appeared to be much stronger than if a leading shoot were left. Here the discussion turned to the subject of black heart in trees, caused by too severe winters, from which nothing new was elicited.

The peach crop was then taken up, and Secretary Bateham said there were very few localities in Ohio where peaches could be successfully grown, and advised caution in the planting.

The varieties most in favor were, however, the Early York, Yellow Rare-ripe, Hale's and Crawford's Early, Stump the World, Early Barnard, Smock Free, Crawford's Late, Old Mixon Free, and Late Heath. The Solway and Susquehannah were considered unreliable.

The subject of Yellows was no peculiar disturbing element as yet in Ohio.

The grape crop, on the islands, was reported as good this year, by Mr. High, as last year.

Mr. Ohmer gave a very pleasant account of the working of the Montgomery Horticultural Society. They held monthly meetings at the residences of the members, and the ladies took an active part in all the discussions and committee work.

The election of officers resulted in the reelection of the old ones, who seem to have been the burden-bearers for many years, and from the kind regard shown them by the members I should think the chances are they will die with the harness on.

The meeting was a grand success in all respects, and the high honor and respect shown your representative led him to believe that our Michigan Society is held in high esteem by our neighbors of the Buckeye State.

There was no lack of attention and kind greeting by President Warder, Secretary Bateham and all others, and when called up and introduced to the audience by the Chair, I could say only in reply that I could accept these courtesies in behalf of the Society and State I had the honor to represent,

but personally I had no right whatever to receive such kindness as had been shown me.

There is much more that to me seems of interest that I might add to this already too long report, but will close with again thanking you for your forbearance and the unmerited honor of representing you.

S. B. MANN.

Report accepted and ordered placed in the records of this meeting.
Mr. Chas. R. Coryell followed with the

REPORT OF DELEGATE TO INDIANA SOCIETY.

Having through your partiality been selected as your representative to the 19th annual meeting of the Indiana Horticultural Society, held in Dublin, Wayne county, Ind., on the 16th, 17th, and 18th of December last, I herewith submit my report, with some account of the doings of that Society.

The meeting was held in Odd Fellows' Hall, which was tastefully decorated with mottoes and pictures; and the rostrum, tables, and shelves were filled with flowers, plants, fruits, grains, vegetables, and curiosities.

Mr. Coffin, of Hendricks county, had a revolving hexagonal rack containing 72 shelves, on which he exhibited 450 apples of 110 varieties that he had grown himself.

There were on exhibition 456 plates of apples that were a credit to the State and to the Society. There was also a good show of other fruits, grains, vegetables, and canned fruits; one can of cherries had been put up 18 years, and appeared all right. Specimen of the wood of the *Catalpa speciosa* that had laid on the ground 68 years and was perfectly sound; plants of the catalpa, etc.

At 2 o'clock P. M. the President, Sylvester Johnson, gave his annual address. He congratulated the Society on the progress they had made the past year. The cultivation of fruits was on the increase throughout the State; there was an increase in the number of varieties, in size, in productiveness, and in flavor. They had secured the passage of an act by the last legislature making it unlawful to kill any insectivorous bird, or to destroy or disturb their eggs, or to net or trap quails at any time, or to kill them from the 1st of January to first of November. The temperature had been 24° below zero in Central Indiana the past winter and still they had peaches. The cold weather had shown them that none of the named varieties of blackberries were hardy except the Snyder, with Taylor's Prolific close to it. With black-cap raspberries, the Gregg only came through unharmed; of the red varieties the Thwack was the least harmed. The President gave a very lengthy report as delegate to the American Pomological Society, which met in biennial session in Rochester, N. Y., in September last.

The Secretary, W. H. Ragan, gave his annual report. The Society receives \$300 per annum from the State and one dollar from each member except honorary members. They have about 100 members, and have on hand \$900. He recommends the revision of the Star Fruit list, and that it be published in the next annual report.

Mr. P. D. Hammond, of Indianapolis, read a "paper," being a criticism of Indiana on fruit growing. In the markets at the present time he finds the apples are grown in Michigan and New York, the pears in California, but the fruit he held in his hand succeeded well in Indiana; it is called the *pomme de terre*.

Evening Session.

The hall was crowded. Dr. Boyd gave the welcoming address. He took pleasure in welcoming the horticulturists to the hospitalities of Dublin, which is a town of 1,200 inhabitants, surrounded by a rich horticultural region, has a union school of 200 pupils, has not a native child over ten years of age who cannot read and write, has six churches and 552 members, has not now and never has permitted a saloon keeper to ply his vocation here, scared one away some years ago by dumping a load of stones opposite and posting a notice for him to leave, and more recently a pump augur found its way through the side of the building and into the barrels and the contents all leaked out. At a certain presidential election there were 307 votes cast for one candidate, and none for the other; we are all horticulturists.

President Johnson responded in his happiest style. He thought there was a peculiar fitness in the society meeting in a temperance town, for in 1875 the society decided that the manufacturing of wine was a business distinct from the occupation of the horticulturist, and resolved that we disapprove of the manufacture of wine and cider as a beverage, and as to the people of Dublin all voting one way, it was all right if they only voted for *our candidate*.

Dr. Furnass then gave a very good lecture "On the planting and care of an apple orchard, and the profits of fruit growing." Get trees with good roots, without being particular about the bodies. Average distance apart 32 feet. Take care of your orchard, set out carefully, grow corn or potatoes and tend them. Don't raise oats in your orchard; never saw a good orchard where oats were grown. Do not manure your land; the soil is good enough all through Indiana without manure. He gave statistics to show if their orchards bore only one year out of four they would make more money than by raising any other crop.

DISCUSSION ON KEEPING WINTER APPLES.

Mr. Hammond thinks their autumns too warm to raise a good keeping winter apple. We must depend on a place having a cooler climate, such as Michigan, New York or Nova Scotia. Mr. Stevens gathers his apples a month earlier than his neighbors, and places them in sugar buckets and hangs them to the joists of his cellar and they keep well.

Mr. Ohmer, of Dayton, gathers early, places in barrels, heads up, lays on the side in the shade; in November, sort and re-barrel, and place in a cool place, keep from freezing and they will not rot. Mr. Hobbs gathers early, puts them in a cool cellar and they keep well. Keeps chickens and pigs in the orchard. Mr. Stout gathers early and puts in a rail pen lined and covered with corn stalks.

Second Day.

REPORTS FROM SEVERAL FRUIT DISTRICTS.

The State is divided into 13 districts, the same as the congressional districts, and a vice-president in each district makes a report.

An election of officers resulted in the reelection of the present incumbents. "Difficulties in the way of successful orcharding," by C. M. Hobbs.

He was surprised to see so few good orchards in the country. People are

continually planting trees, but do not take care of them. Plant smooth, well-grown trees, two or three years old, on high, dry soil, that have been raised on land having more or less clay in it. Cultivate four or five years with some hoed crop, and then seed to grass. Prune every year at any time when the wood is not frozen; keep pigs and chickens in the orchard; encourage the birds; take care of your fruit, and do not rush it on the market when it is glutted.

GENERAL DISCUSSION.

CABBAGE WORM.

Dr. Boyd tried an experiment with the cabbage worm, and he found that the progeny of one adult moth made three generations in four months, and was capable of producing 27,000 offspring in four months' time. To kill them he tried soap suds, salt, copperas, and hot water. All failed. Took four boards 20 feet long, made a box and covered it with mosquito netting; total cost was \$2.75. For four months saw the moths trying to get in; worth to see them fail, 25 cents per day, \$30. Net profit, besides 150 cabbages, \$27.25, and nets and boards left.

Mr. Mason—Dr. Boyd's method would not pay a market gardener, he raises from 17,000 to 20,000 cabbages each year. The worms do not trouble those in the interior of the field; we do nothing with them. Can catch the miller with a scoop net.

CURRANT WORM.

Mr. Marsh—One-fourth pound of hellebore put in water and sprinkled on, is good for 200 bushes. Mr. Richie uses hellebore with impunity and raises good currants. Mr. Trowbridge uses a hand bellows and blows sulphur on them while the dew is on. Mr. Stevens kills them with sulphur. E. Y. Tease kills them with Paris green.

"NEW FOREIGN FRUITS."

E. Y. Tease—It was a matter of surprise to the writer, that China and Japan, the oldest two nations in the world, living principally on vegetables, have produced so little fruit. The Japanese government exhibited wax casts of all their leading fruits cultivated or known in the empire, at the Centennial. The entire collection, embracing apples, pears, plums, grapes, oranges, figs, lemons, etc., contained only about 50 specimens; while the Iowa Horticultural Society had casts of over 1,000 specimens from a State not yet thirty years old.

The seedlings of the Chinese pears have already produced some very choice varieties. The Sha-lea or Sand pear, and the Sewt-lea or Snow pear, are the best varieties known to the Chinese. These fruits are as large and as golden as large oranges, possessing also an agreeable flavor, with a delightful perfume; they never become mellow and toothsome, but are good for canning and preserving. The trees are remarkably hardy and vigorous and free from blight; the leaves are two or three times the size of common pear leaves, and thick and leathery. They withstand the heat and drouth of the South and Southwest, and are thought to be hardier in the North than the common pear.

From the Sand pear we have the seedling LeConte. The tree is as vigorous and healthy as the Cottonwood, an early and abundant bearer, fruit as large as the Bartlett, ripens at the same time, and so firm it may be shipped to Europe, and it brought higher prices in New York than the Bartlett. Kiefer's Hybrid, a cross of the Sand pear and Bartlett, ripens in October. Cocklin's Hybrid a cross of the Sand pear and Louise Bonne de Jersey, is the handsomest pear I ever saw, ripens in September.

The Japanese pears resemble the Chinese excepting the leaves are deeply serrated and the fruit is apple-shaped. We have the Mikado Von Siebold and Hawaii; don't know when they were introduced. The Chinese pears were imported by the late Wm. R. Prince, 50 or 60 years ago. He found last summer in the latitude of central Indiana, a Chinese Snow pear 28 years planted, 35 feet high, trunk 18 inches diameter, vigorous and healthy, loaded with fruit. This tree is surrounded by common pear trees and hybrids. Nearly 100 of these seedlings were in bearing, some of them of good size; no trees in market. The Japan quince may also claim our attention. He had no doubt but by raising seedlings from the best specimens, in time, fruits of great value might be obtained.

In conclusion, he earnestly recommended to young men and old ones too, the scientific production of new fruits by hybridization, and repeating Mr. Webster's remarks, "there is always room for more on the top shelf." Mr. Tease exhibited specimens of the Chinese and Japanese pears and quinces and their foliage.

Mr. Ragan gave his report as delegate to Illinois, and Mr. Ratliff as delegate to Michigan.

Mrs. H. V. Austin gave a very good "paper" on

APPLES,

And Mr. Cowing on

STRAWBERRIES.

Captain Jack, Crescent Seedling, Cumberland Triumph, Champion, Monarch and Kentucky were highly recommended. Some other kinds did not do so well on his grounds. He grew about 700 bushels on $4\frac{1}{2}$ acres of ground.

"A Talk on Trees," by Mrs. Dr. Boyd, was a very fine poetic and historic "paper."

"Horticultural Recollections," by E. Y. Teas, was the reminiscences of the Society in years agone.

Evening Session.

The hall was crowded. Dr. A. W. Brayton, of Indianapolis, gave a lecture on the

BIRDS OF INDIANA.

The Doctor illustrated his lecture with specimens of stuffed birds, which were passed around through the audience as he proceeded.

There are 10,000 species of birds in the world, and about 280 species in Michigan and Indiana. There are 150 species that make their nests and rear their young in the state. There are 10 or 12 species of winter varieties, snow birds, that come down to us from the Arctic regions in snowy or cold weather. A great many of our birds live in South America in the winter and follow the

sun north, devouring myriads of insects as they pass and repass. There are but few of our native birds that are not our friends. We should take every means to protect and increase the number of our birds, that they may hold the insects in check.

Prof. Riley not being present, Dr. Warder, of Ohio, entertained the Society with some very appropriate remarks on Elementary Entomology. He also gave a talk on the

CATALPA SPECIOSA.

The Doctor says he has the Catalpa on the brain. This is the coming tree and will supply all our wants. It grows readily from the seed, grows rapidly, tall and straight. It does not decay, it will lay on the ground 100 years and be sound. He had pieces that had been on the ground 68 years and were sound. It makes good posts, telegraph poles, cross ties, timbers, shingles, cabinet work, and live fence posts.

Friday morning was devoted to hearing reports, redistricting the state, making six districts, appointing delegates to attend the Horticultural meetings of adjoining states, deciding on a place for holding the next meeting, which was Crawfordsville, Ind.; hearing reports from committees on fruit on exhibition, unfinished business, and final resolutions.

This was the most largely attended of any meeting the society ever held. The hall, with a seating capacity of 400, was filled in the evening, and from one-half to two-thirds in the day sessions with earnest, practical, working members, and attentive interested spectators, of whom one-third to one-half were ladies.

Your delegate, as representative of your society, was truly honored with all the attention and courtesies that could have been desired. They publicly introduced and warmly welcomed him to their meeting, and elected him an honorary member, with all the privileges of membership, as a compliment to your society. The members of the Indiana society have placed the Michigan society under obligations for kind attention and hospitality to your representative, and personally I am their debtor.

All of which is respectfully submitted.

Report accepted and ordered printed in full with the records of this meeting.

An allusion to Keifer's Hybrid pear in the paper caused a number to inquire of President Lyon his opinion of that variety. Mr. Lyon stated that he did not think very favorably of it, as its flavor was ordinary only.

Prof. J. C. Holmes gave a simple and effectual recipe for killing worms on cabbages. It consists of wheat bran spread over the plants; and whale oil soap was also recommended.

The following statement and resolution were adopted unanimously as the sense of the meeting:

From the valuable reports of our delegates to Ohio and Indiana, giving an epitome of the transactions of these sister societies, at their annual meetings, we are led to see the good to accrue from the practice of sending delegates to the meetings of societies in adjoining States; therefore,

Resolved, That we endorse the system of sending delegates to the annual conventions of Horticultural Societies in adjoining States, as far as consistent with the condition of the finances of our Society.

MISCELLANEOUS BUSINESS.

At the winter meeting the new form of the constitution, suited to the present wants of the Society, was presented for action by the committee having it in charge, and laid over one meeting under the rules.

On motion of W. K. Gibson the new draft of the constitution was taken from the table and acted upon by articles.

Two forms of the first article were read by the chairman, the only difference between them being the name of the society. A long discussion ensued, in the course of which resolutions to "lay on the table," "indefinitely postpone," etc., were lost; a resolution limiting speeches to three minutes, carried, and a good deal of earnestness exhibited on both sides.

Finally the resolution to adopt the article was brought to vote and carried by a large majority, there being but seven negative votes. The text of the article as adopted is as follows:

The name of the Society shall be the Michigan State Horticultural Society, and its territory shall be the State of Michigan. Its objects shall be the development of an adequate appreciation of the soils and climate of the State to the pursuit of horticulture in all its branches, and the collection and dissemination of information bearing upon the theory and practice of the same, as well as upon the arts and sciences directly or indirectly associated therewith, or calculated to elevate or improve the practice thereof.

The other articles were adopted as recommended by the committee without opposition.

The constitution as it now stands may be found in the preliminary pages of this volume.

W. K. Gibson of the committee on resolutions reported the following:

Resolved, That the thanks of the society be tendered to the citizens of Battle Creek for the welcome given to, and the attentions bestowed upon its members while here, and that we desire also to acknowledge our grateful appreciation of the excellent music furnished by Mr. Pool and associates of Pennfield Grange, and by Prof. J. E. White and others, which so largely contributed to the pleasure and enjoyment of our meeting.

Resolved, also, That our especial thanks are due to the officers and members of Grange No. 66 of Battle Creek, and to N. Chilson, Esq., and the committee of arrangements, for their large hospitality and their earnest efforts to make our meeting a success.

Resolved, That the thanks of the society be extended to the representatives of the press who have been constant attendants upon our sessions, and thus assisted to bring our work permanently before the people.

The report adopted and ordered placed on the records of this meeting.

The secretary announced that the next meeting would be in connection with the State Agricultural Society at the annual fair in Detroit, September 13 to 18; and that the annual meeting would be held with the Washtenaw County Pomological Society at Ann Arbor the first week in December.

Society adjourned.

THE ANNUAL FAIR OF 1880.

GENERAL ARRANGEMENTS.

The Annual Fair was held September 13th to 20th, with the State Agricultural Society, in the city of Detroit. The days could not have been finer, but the wet weather of August and early September forced both farmers and fruit growers into excessive labor about the time in which fruit should have been gathered for the fair, and hence the entries previous to the fair week were very light.

In arranging for the pomological department of the fair, the divisions were gathered in five sections, and a member of the Executive Board placed in charge of each section. Mr. N. Chilson, of Battle Creek, was made General Superintendent of the Hall. C. R. Coryell, of Jonesville, had charge of divisions A, B, C and D, which included general collections of fruits and special exhibits of apples; E. F. Guild, of East Saginaw, took in charge divisions E, F, G and H, comprising special exhibits of pears, peaches, grapes and plums; James Satterlee, of Greenville, looked after divisions J, K, L, M and N, which included single plates of all kinds of fruit; S. B. Mann, of Adrian, had in charge canned, pickled, preserved and dried fruits; W. K. Gibson, of Jackson, by his proxy, Mr. Wm. Rowe, of Grand Rapids, looked after plants and flowers. The nursery stock came under the supervision of the General Superintendent.

By resolution of the Board, each of these division superintendents was made chairman of the viewing committee in the division under his charge. The plan worked admirably. The chairman knew where every entry was placed, and there was no waste of time in finding things; hence the committee-work was rapidly done, and the books in the Secretary's hands before the close of Thursday, and most of the premium checks drawn.

Another item in the arrangements for the fair aided materially in expediting the work in the Secretary's office as well as the work of committees. Blank sheets were printed previous to the fair, and each entry was placed upon one of the sheets. The entrees completed, these sheet were gathered into their proper divisions and bound together for the committees. The following is the blank used for this purpose:

MICHIGAN STATE HORTICULTURAL SOCIETY.

<i>Division</i>	<i>Class</i>	<i>Entry No.</i>
<i>By</i>		
<i>Of</i>		

County of....., State of.....

Exhibit.....

Premium awarded.....

The above award is made by your committee in consideration of the varieties contained in such exhibit, hereinafter named in what is, by your committee, esteemed to be the order of their value for the purpose specified; reference being had, firstly, to the value of the variety for such purpose; secondly, to the color, size, and evenness of the specimens; and thirdly, to their freedom from the marks of insects or other blemishes. Your committee have rendered such award in consideration of the following varieties, named in the order of their value, viz:

.....

Remarks.....

.....

.....Committee.

NOTES ON THE REGISTER OF ENTRIES.

The whole number of entries was just 1,000—one-third less than last year; and this with more fruit in Michigan than was ever known before. Evidently the collectors thought that in this season of abundance the competition would be too close to pay for the exertion of gathering the fruit. The apple entries were as many as usual, but on other fruits there were very few. The plant exhibit was not large, but comprised some very fine specimens.

VIEWING COMMITTEES.

In the first section comprising divisions A, B, C and D, the viewing committee were C. R. Coryell, Jonesville; A. C. Glidden, Paw Paw; A. G. Gulley, South Haven. In the second section, made up of divisions E, F, G and H, the committee consisted of E. F. Guild, East Saginaw; J. M. Blowers, Lawrence; Wm. H. Ramsdell, Plymouth. In the third section of single plates, James Satterlee, Greenville; F. W. Noble, Detroit; C. Engle, Paw Paw; Wm. H. Ramsdell, Plymouth, comprised the committee.

Mr. S. B. Mann, in the fourth section of canned and pickled fruits, etc., chose as his associates Mrs. S. B. Mann, and Miss Mary Harris, of Detroit. In the section of plants and flowers, Mr. Wm. Rowe, of Grand Rapids, and Miss F. L. Noble, of Detroit, awarded the premiums.

LIST OF AWARDS MADE BY THE MICHIGAN STATE HORTICULTURAL SOCIETY AT THE FAIR OF 1880.

DIVISION A—GENERAL COLLECTION OF FAMILY FRUITS.

In this division there were five entries of collections by societies and municipalities, and four entries of collections by grower.

Class 1. Collection of fruits for family purposes exhibited by society, grange or municipality. First premium, Wayne County, by Wm. H. Ramsdell, of Plymouth. In this collection there were 101 varieties of apples, 16 varieties

of pears, 3 varieties of peaches, 4 varieties of plums, and 7 of grapes. The collection, although light in peaches and grapes, was extra in apples, and this, with the locality in consideration, accounts for the award. Second premium, Allegan County Pomological Society, by Lyman A. Lilly, of Allegan village. In this collection were found 32 varieties of apples, 11 of peaches, 6 of grapes, 6 of pears, 1 variety of plums, 1 of quinces, and 2 of crab-apples. The award was made in consideration of the excellent selection and the kinds of fruit represented. The third premium was given the Grand River Valley Horticultural Society, represented by Wm. Rowe, S. M. Pearsall, P. W. Johnson, and others. This collection was made up of 53 sorts of apples, 4 of peaches, 3 of grapes, 4 of pears, and 4 of crab-apples. Had this collection been as well represented in other fruits than apples as the collections of this society usually are, it would have materially changed the awards in this class.

Class 2. Collection of family fruits exhibited by grower. First premium, H. E. Bidwell, Plymouth. In this collection were 54 varieties of apples, 7 of pears, 4 of peaches, 3 of plums, 5 of grapes. Second premium, J. M. Blowers, of Lawrence. This collection had in it 52 varieties of apples, 4 of pears, 3 of plums, 3 of grapes, 3 of crab-apples, 1 peach and one quince. Third premium, A. A. Olds, Decatur. In his collection were 44 sorts of apples, 4 of pears, 3 of grapes, 3 of crab-apples, 3 of plums, 1 quince and one peach. Fourth premium, F. M. Benham, of Olivet, who had an aggregate of 72 plates.

Nomenclature.—In this division the committee on nomenclature awarded one premium of \$10 to the collection of Mr. Ramsdell in class one, as being the most correctly labelled collection on exhibition.

DIVISION B.—GENERAL COLLECTION MARKET FRUITS.

In this division there were six entries by societies and municipalities, and only one by a grower. The collections were very choice and well named.

Class 1. Collection of market fruits by society, grange or municipality. First premium, Grand River Valley Horticultural Society: the display covering 115 plates—100 of apples, 5 grapes, 6 pears and four crab-apples. Second premium, J. M. Blowers, Lawrence. Third premium, Wm. H. Ramsdell, Plymouth.

Class 2. Collection of market fruits by grower. First premium, H. E. Bidwell, Plymouth. This was the only collection entered in this class, and it contained 80 plates of fruit.

Nomenclature.—Mr. Bidwell's collection in class 2 was awarded the premium as best named collection in the whole division.

DIVISION C—SPECIAL EXHIBITS OF APPLES FOR GENERAL PURPOSES.

There were eight entries in the two sections of this division. Mr. Bidwell entered a collection from his own orchard in both classes, and because he failed to designate the fact that in class 1 he entered for a municipality, his collection was thrown out of competition, and was awarded a special premium equal to the first in amount.

Class 1. Collection of apples for general purposes by society, grange or municipality. First premium, Grand River Valley Horticultural Society. This collection contained 67 varieties. Second premium, Allegan County Pomological Society—33 varieties.

Class 2. Collection of 25 varieties of apples for family purposes, by grower. First premium, H. E. Bidwell, Plymouth. This collection was composed of the following varieties: Yellow Bellflower, Rhode Island Greening, Jonathan,

Twenty-ounce, Northern Spy, Talman Sweet, Golden Russet, Peck's Pleasant, Red Canada, Belmont, Melon, Jersey Sweet, Esopus Spitzenburgh, Wagener, Keswick Codlin, Lowell, Primate, Large Yellow Bough, Summer Pearmain, Shiawassee Beauty, Maiden's Blush, King of Tompkins County, Fameuse and Hawley. Second premium, A. A. Olds, Decatur. Third premium, J. M. Blowers of Lawrence. Mr. Blowers' list was as follows: Westfield Seek-no-further, President, Roxbury Russet, Fall Pippin, Baldwin, Fameuse, Peck's Pleasant, Chenango Strawberry, Jersey Sweet, Hubbardston Nonsuch, Green Newtown Pippin, Esopus Spitzenburg, Twenty Ounce, Fallawater, Ben Davis, Maiden's Blush, Rhode Island Greening, Wagener, Pound Sweet, Northern Spy, Red Canada, Golden Russet, Talman Sweet, Canada Reinette, Fall Jenneting.

Nomenclature. The premium for best labeled collection in this division was awarded to the Grand River Valley Horticultural Society.

DIVISION D—SPECIAL EXHIBITS OF MARKET APPLES.

In this division there were 18 entries distributed as follows: 6 in class 1, 7 in class 2, 5 in class 3.

Class 1. Exhibit of 12 varieties of market apples by the grower. First premium, H. E. Bidwell, Plymouth, upon the following list: Baldwin, Golden Russet, Jonathan, Melon, Rhode Island Greening, Roxbury Russet, Red Canada, Northern Spy, Porter, Maiden's Blush, Shiawassee Beauty, Peck's Pleasant. The committee remarked favorably on the selection of varieties and specimens. Second premium, J. M. Blowers, Lawrence, upon the following list: Stark, Maiden's Blush, Melon, Westfield Seek-no-further, Esopus Spitzenburg, Golden Russet, Talman Sweet, Red Canada, Wagener, King, Ben Davis, Rhode Island Greening. Third premium, A. A. Olds, Decatur. Fourth premium, Lyman A. Lilly, Allegan.

Class 2. Exhibit of 6 market apples by grower. First premium, H. E. Bidwell, Plymouth. Varieties: Rhode Island Greening, Baldwin, Red Canada, Jonathan, Golden Russet, Northern Spy; all fine market sorts and beautiful specimens. Second premium, Lyman A. Lilly, Allegan. Varieties: Rhode Island Greening, Baldwin, Jonathan, Maiden's Blush, Northern Spy, Golden Russet; varieties and samples all very good. Third premium, Geo. E. Jewett. Varieties: Northern Spy, Peck's Pleasant, St. Lawrence, Jonathan, Baldwin, Golden Russet. Fourth premium, J. M. Blowers, Lawrence.

Class 3. Single variety market apple shown by grower. First premium, Baldwin, shown by L. A. Lilly of Allegan. The award was made in consideration of the standing of the apple in the state, the number of plates of this variety in competition, and the superiority of this plate. Second premium, Red Canada, grown by H. E. Bidwell of Plymouth. Third premium, Rhode Island Greening, grown by F. M. Benham of Olivet.

DIVISION E—SPECIAL EXHIBITS OF PEACHES.

There were 17 entries in this division, representing Oceana, Van Buren, Eaton, Allegan and Kalamazoo counties.

Class 1. Exhibit of not less than 12 varieties of peaches by grange, society or municipality. First premium, South Haven Pomological society, by A. G. Gulley; second premium, Allegan County Pomological Society, by Lyman A. Lilly, Allegan.

Class 2. Exhibit of 10 varieties of peaches by grower. First premium, E. J. Shirts, Shelby, Oceana county.

Class 3. Exhibit of 8 varieties of peaches for market by grower. First premium, A. G. Gulley, South Haven; second premium, E. J. Shirts, Shelby.

Class 4. Exhibit of 4 varieties of peaches for market by grower. First premium, A. G. Gulley, South Haven; second premium, E. J. Shirts, Shelby.

Class 5. Exhibit of single variety market peach by grower. First premium, Late Crawford, grown by George E. Jewett, Allegan; second premium, Late Crawford, grown by E. J. Shirts, Shelby; third premium, Late Crawford, grown by Lyman A. Lilly, Allegan.

Nomenclature.—The best named collection was that of South Haven Pomological Society, shown by Mr. Gulley, which was awarded the premium by committee on nomenclature.

DIVISION F—SPECIAL EXHIBITS OF PEARS.

The entries in this division were very light.

Class 1. Exhibit of 12 varieties of pears for general purposes by society, grange or municipality. There was but one entry in this class, by Mr. Benham, of Olivet, and this was not full, receiving no award.

Class 2. Exhibit of 10 varieties of pears for general purposes by grower. First premium, George B. Russell, Detroit. This was a very admirable collection, and attracted a good deal of attention. The varieties in the succession were as follows: Flemish Beauty, White Doyenné, Louise Bonne de Jersey, Onondaga, Seckel, Stevens' Genessee, Duchesse d'Angouleme, Bleeker's Meadow, Beurre d'Anjou, Winter Nélis, Vicar of Winkfield, Beurré Gris d'Hiver Nouveau. Second premium, F. M. Benham, Olivet.

Class 3. Exhibit of 6 varieties of pears for market by grower. Only one entry in this class, which took first premium, F. M. Benham, Olivet.

Class 4. Exhibit of 3 varieties of pears for market by grower. First premium, H. W. Doney, Jackson. Varieties: Bartlett, Sheldon, Seckel; second premium, F. M. Benham, Olivet.

Class 5. Exhibit of single variety of pear for market by grower. Only one entry in this class, by F. M. Benham, which took first premium.

DIVISION G—SPECIAL EXHIBITS OF PLUMS.

There was no competition in this division, the only entries being made by E. J. Shirts, of Shelby, Oceana county, who took first premium in classes 2, 3, 4, and 5.

DIVISION H—SPECIAL EXHIBITS OF GRAPES.

Class 1. Exhibit of 15 or more varieties of grapes by society, grange or municipality. Second premium, Olivet collection, by F. M. Benham.

Class 3. Exhibit of 6 varieties of grapes for dessert and family purposes by grower. First premium, E. W. Cottrell, Greenfield, Wayne county; second premium, F. M. Benham, Olivet.

Class 4. Exhibit of 3 varieties of native grapes for market by grower. First premium, E. W. Cottrell, Greenfield; second premium, Albert Wedthoff, Bay City.

Class 5. Exhibit of single variety native market grape by grower. First premium, C. W. Robinson, Detroit—Concord; second premium, Albert Wedthoff, Bay City—Concord.

Class 6. Exhibit of 5 varieties foreign grapes grown under glass. First premium, A. Sigler, Adrian.

Class 7. Single variety foreign grapes grown under glass. In this class two

first premiums were awarded, one to Chas. T. Allen, Detroit, another to A. Sigler, Adrian.

DIVISION J—APPLES—SINGLE PLATES.

This division always brings a large amount of work to the viewing committee; but owing to the admirable arrangement of varieties this season, the awards were made very rapidly.

Red Astrachan—Four entries made but none shown.

Primate—Three entries. First premium, H. E. Bidwell, Plymouth.

Large Yellow Bough—Four entries. First premium, H. E. Bidwell, Plymouth; second premium, P. W. Johnson, Grand Rapids; third premium, A. D. Benham, Olivet.

Early Strawberry—Three entries. First premium, H. E. Bidwell, Plymouth.

Early Joe—Third premium, H. E. Bidwell, Plymouth.

Maiden's Blush—Eight entries. First premium, H. E. Bidwell, Plymouth; second premium, S. M. Pearsall, Grand Rapids; third premium, E. J. Shirts, Shelby.

Lowell—Four entries. First premium, H. E. Bidwell, Plymouth.

Porter—Three entries. First premium, H. E. Bidwell, Plymouth; second premium, A. D. Benham, Olivet.

Keswick Codlin—Two entries. First premium, H. E. Bidwell, Plymouth; second premium, P. W. Johnson, Grand Rapids.

Twenty-ounce—Ten entries. First premium, H. E. Bidwell, Plymouth; second premium, S. M. Pearsall, Grand Rapids; third premium, A. A. Olds, Decatur.

Chenango Strawberry—Five entries. First premium, S. M. Pearsall, Grand Rapids; second premium, E. J. Shirts, Shelby; third premium, J. M. Blowers, Lawrence.

Hawley—Three entries. First premium, H. E. Bidwell, Plymouth; second premium, E. J. Shirts, Shelby; third premium, A. D. Benham, Olivet.

Dyer—Three entries. First premium, H. E. Bidwell, Plymouth; second premium, A. D. Benham, Olivet.

Jersey Sweet—Five entries. First premium, H. E. Bidwell, Plymouth; second premium, A. A. Olds, Decatur; third premium, J. M. Blowers, Lawrence.

Blenheim Pippin—Two entries. First premium, A. D. Benham, Olivet.

Fall Pippin—Eight Entries. First premium, H. E. Bidwell, Plymouth; second premium, H. C. Clark, Ann Arbor; third premium, R. M. Webster, Armada.

Ohio Nonpareil—First premium, H. E. Bidwell, Plymouth.

Summer Pearmain—First premium, H. E. Bidwell, Plymouth; second premium, A. D. Benham, Olivet.

Autumn Swaar—First premium, N. Chilson, Battle Creek; third premium, H. E. Bidwell, Plymouth.

Peck's Pleasant—Ten entries. First premium, Mrs. P. V. Aldrich, Armada; second premium, H. E. Bidwell, Plymouth; third premium, N. Chilson, Battle Creek.

Rhode Island Greening—Thirteen entries. First premium, J. D. Perry, Bell Branch; second premium, H. E. Bidwell, Plymouth; third premium, S. M. Pearsall, Grand Rapids.

Baldwin—Fourteen entries. First premium, N. Chilson, Battle Creek; sec-

ond premium, S. M. Pearsall, Grand Rapids; third premium, L. A. Lilly Allegan.

Red Canada—Eleven entries. First premium, H. C. Clark, Ann Arbor; second premium, S. M. Pearsall, Grand Rapids; third premium, A. D. Benham, Olivet.

Golden Russet—Ten entries. First premium, P. W. Johnson, Grand Rapids; second premium, H. E. Bidwell, Plymouth; third premium, Geo. E. Jewett, Allegan.

Roxbury Russet—Eleven entries. First premium, R. M. Webster, Armada; second premium, S. M. Pearsall, Grand Rapids; third premium, Mrs. P. V. Aldrich, Armada.

Wagener—Eight entries. First premium, R. M. Webster, Armada; second premium, E. J. Shirts, Shelby; third premium, Mrs. P. V. Aldrich, Armada.

Northern Spy—Twelve entries. First premium, L. A. Lilly, Allegan, second premium, R. M. Webster, Armada; third premium, S. M. Pearsall, Grand Rapids.

Belmont—Six entries. First premium, J. H. Peabody, Birmingham; second premium, H. C. Clark, Ann Arbor; third premium, A. D. Benham, Olivet.

Fameuse—Nine entries. First premium, J. H. Peabody, Birmingham; second premium, H. E. Bidwell, Plymouth; third premium, H. C. Clark, Ann Arbor.

Bailey's Sweet—Five entries. First premium, A. A. Olds, Decatur; second premium, Geo. E. Jewett, Allegan; third premium, H. E. Bidwell, Plymouth.

Westfield Seek-no-further—Seven entries. First premium, Geo. E. Jewett, Allegan; second premium, H. E. Bidwell, Plymouth, third premium, J. D. Perry, Bell Branch.

Hubbardston Nonsuch—First premium, A. A. Olds, Decatur.

King of Tompkins County—Eight entries. First premium, Mrs. P. V. Aldrich, Armada; second premium, E. J. Shirts, Shelby; third premium, S. M. Pearsall, Grand Rapids.

Yellow Bellflower—Six entries. First premium, H. E. Bidwell, Plymouth; second premium, David Geddes, Saginaw; third premium, H. C. Clark, Ann Arbor.

Talman Sweet—Thirteen entries. First premium, R. M. Webster, Armada; second premium, A. D. Benham, Olivet; third premium, P. W. Johnson, Grand Rapids.

Ladies' Sweet—Three entries. Second premium, H. E. Bidwell, Plymouth. Shiawassee Beauty—Three entries. First premium, H. E. Bidwell, Plymouth; second premium, S. S. Bailey, Grand Rapids.

Grimes' Golden—Five entries. First premium, A. D. Benham, Olivet; second premium, A. D. Benham, Olivet; third premium, P. W. Johnson, Grand Rapids.

Swaar—Seven entries. First premium, H. E. Bidwell, Plymouth; second premium, E. J. Shirts, Shelby; third premium, A. A. Olds, Decatur.

Esopus Spitzenburgh—Five entries. First premium, H. E. Bidwell, Plymouth; second premium, A. D. Benham, Olivet; third premium, R. M. Webster, Armada.

Melon—Five entries. First premium, H. E. Bidwell, Plymouth; second premium, J. M. Blowers, Lawrence; third premium, A. D. Benham, Olivet.

Jonathan—Six entries. First premium, J. M. Blowers, Lawrence; second premium, H. E. Bidwell, Plymouth; third premium, E. J. Shirts, Shelby.

Mann—Three entries. First premium, E. Miner, Grand Rapids.

In class 54, which includes varieties not elsewhere entered, there were 32 entries. The first three premiums were given to Black Gilleflower, shown by J. H. Peabody, Birmingham; Fallawater, shown by David Geddes, Saginaw; Alexander, shown by H. E. Bidwell, Plymouth. The second premiums were awarded to Stark, shown by A. A. Olds, Decatur; St. Lawrence, shown by H. E. Bidwell, Plymouth; Alexander, shown by E. J. Shirts, Shelby. The third premiums were given to Pound Royal, shown by J. H. Peabody, Birmingham; President, shown by J. M. Blowers, Lawrence; Pound Royal, shown by S. M. Pearsall, Grand Rapids.

Transcendent Crab—Three entries. Second premium, A. D. Benham, Olivet.

Hyslop Crab—Four entries. First premium, E. J. Shirts, Shelby; second premium, A. A. Olds, Decatur; third premium, A. D. Benham, Olivet.

DIVISION K—PEARS—SINGLE PLATES.

Bartlett—Ten entries. First premium, Philo Parsons, Detroit; second premium, D. W. Howard, Pentwater; third premium, H. W. Doney, Jackson.

Flemish Beauty—Six entries. First premium, H. W. Doney, Jackson; second premium, Mrs. P. V. Aldrich, Armada.

Seckel—Six entries. First premium, Mrs. P. V. Aldrich, Armada; second premium, H. W. Doney, Jackson; third premium, Philo Parsons, Detroit.

Onondaga—First premium, H. C. Engel, Detroit.

White Doyenné—Four entries. First premium, Philo Parsons, Detroit; second premium, E. J. Shirts, Shelby.

Beurré d'Anjou—Five entries. First premium, A. D. Benham, Olivet; second premium, Philo Parsons, Detroit; third premium, D. J. Mattock, Toledo, Ohio.

Sheldon—Seven entries. First premium, H. W. Doney, Jackson.

Fondante d'Automne—First premium, A. D. Benham, Olivet.

Lawrence—Second premium, A. D. Benham, Olivet.

Louise Bonne de Jersey—Seven entries. First premium, A. D. Benham, Olivet; second premium, A. A. Olds, Decatur; third premium, Wm. Sowerby, Detroit.

Duchess d'Angouleme—seven entries. First premium, A. D. Benham, Olivet; second premium, H. C. Engel, Detroit; third premium, D. J. Mattock, Toledo, Ohio.

In Class 26. Any other variety not mentioned, there were thirteen entries. The three first premiums were awarded as follows: Winter Nélis, grown by A. D. Benham, Olivet; Dana's Hovey, grown by A. D. Benham, Olivet; Howell, grown by A. D. Benham, Olivet. The second premiums were as follows: Dr. Reeder, and Doyenné Boussock, grown by A. D. Benham; Howell, grown by A. A. Olds, Decatur; Belle Lucrative, grown by Mrs. Elvira Elliott, Lansing. The third premium was to the Gray Doyenné, grown by Philo Parsons, Detroit.

DIVISION L.—PEACHES—SINGLE PLATES.

In this division and the one following, a number of seedlings of uncommon merit were exhibited by Mr. C. Engle, of Paw Paw. The Executive Board awarded a special premium in recognition of their value.

Hale's Early—First premium, E. J. Shirts, Shelby.

Early Crawford—First Premium, E. J. Shirts, Shelby.

Barnard—First premium, E. J. Shirts, Shelby.

Old Mixon Free—First premium, A. G. Gulley, South Haven; second premium, E. J. Shirts, Shelby.

Jacques Rareripe—First premium, A. G. Gulley, South Haven.

Late Crawford—Six entries. First premium, C. Engle, Paw Paw; second premium, Mrs. Sylvester Farmer, Detroit; third premium, A. G. Gulley, South Haven.

Hill's Chili—Four entries. First premium, John G. English, Manchester; second premium, A. G. Gulley, South Haven; third premium, E. J. Shirts, Shelby.

Smock—First premium, A. G. Gulley, South Haven.

Foster—First premium, E. J. Shirts, Shelby

Large Early York—First premium, A. D. Benham, Olivet.

In Class 20—Any other variety not named above. The premiums were distributed as follows: Susquehanna—First premium shown by E. J. Shirts, Shelby. Susquehanna—Second premium shown by A. G. Gulley, South Haven.

Under Seedling peaches, there were a number of entries. E. W. Cottrell exhibited the "Garfield." Committee said of it: "For amateur growers; very fine flavor; light fleshed; medium pit."

C. Engle exhibited the "Michigan," "Eliza," "Josephine," and "Juno." Of the first the committee remarked: "Fine flavor; yellow fleshed; free stone—a good market peach." Of the second: "Not quite equal to 'Michigan' or 'Josephine.'" Of the third: "Good market peach; as promising as Michigan; a little later, and not as high colored." Of the fourth: "Cling; late; not in season for best flavor; large; yellow fleshed, and fine looking."

DIVISION M—GRAPES—SINGLE PLATES.

Concord—First premium, E. W. Cottrell, Greenfield; second premium, C. W. Robinson, Detroit.

Ives'—Second premium, E. W. Cottrell, Greenfield.

Iona—First premium, H. C. Engel, Detroit.

Hartford Prolific—First premium, C. W. Robinson, Detroit; second premium, E. W. Cottrell, Greenfield.

Isabella—First premium, C. W. Robinson, Detroit.

Martha—First premium, E. W. Cottrell, Greenfield.

Lady—First premium, E. W. Cottrell, Greenfield.

Brighton—First premium, E. W. Cottrell, Greenfield.

Agawam—First premium, E. W. Cottrell, Greenfield.

Salem—First premium, E. W. Cottrell, Greenfield.

Merrimac—First premium, E. W. Cottrell, Greenfield.

Wilder—First premium, E. W. Cottrell, Greenfield.

Prentiss—First premium, T. S. Hubbard, Fredonia, N. Y.

Janesville—Third premium, E. W. Cottrell, Greenfield.

Telegraph—Second premium, E. W. Cottrell, Greenfield.

Elvira—First premium, E. W. Cottrell, Greenfield.

The "Niagara" was shown by the Niagara Grape Company, of Lockport, N. Y. The variety was not entered for premium. The committee spoke of the display as follows: "We find a very fine display of Niagara grapes by Mr. Babcock, who represents the Niagara Grape Company. The variety has choice flavor, large clusters, and has great promise as a market grape."

The committee spoke in terms of praise of Mr. C. Engle's seedlings, but

these will be more fully reported upon at the annual meeting by the committee on new fruits.

DIVISION N.—PLUMS—SINGLE PLATES.

Lombard—First premium, D. L. Garver, Hart; second premium, E. J. Shirts, Shelby; third premium, Mrs. Sylvester Farmer, Detroit.

Duane's Purple—First premium, E. J. Shirts, Shelby.

Yellow Egg—First premium, D. W. Howard, Pentwater.

Coe's Golden Drop—First premium, C. Engle, Paw Paw; second premium, E. J. Shirts, Shelby.

Bavay's Green Gage—First premium, E. J. Shirts, Shelby.

Prince's Yellow Egg—First premium, E. J. Shirts, Shelby.

Damson—First premium, Mrs. Sylvester Farmer, Detroit.

Bradshaw—Third premium, Mrs. Sylvester Farmer, Detroit.

Imperial Gage—First premium, E. J. Shirts, Shelby.

German Prune—First premium, Mrs. Sylvester Farmer, Detroit; second premium, E. J. Shirts, Shelby.

Bleeker's Gage—First premium, C. Engle, Paw Paw; second premium, E. J. Shirts, Shelby.

In "plate of any other variety," D. L. Garver, of Hart, carried off a first premium on a California egg.

Quinces—A. A. Olds and Wm. Sowerby carried away first premiums; Miss Maggie Curry and A. A. Olds took second premiums in this class.

DIVISION O—DRIED FRUITS.

In this division there was the most complete harmony on the part of exhibitors; quite a contrast with the feeling a year ago. This was partly due to better regulations concerning the entries.

Collection Domestic Dried Fruits—First premium, Mrs. A. McClary, Galesburg.

Dried Apples—Five entries. First premium, Mrs. Elvira Elliott, Lansing; second premium, Mrs. R. M. Cook, Charlotte.

Dried Pears—Six entries. First premium, Mrs. P. V. Aldrich, Armada; second premium, Mrs. A. McClary, Galesburg.

Dried Peaches—Five entries. First premium, Mrs. P. V. Aldrich, Armada; second premium, Mrs. A. McClary, Galesburg.

Dried Plums—Five entries. First premium, Mrs. Elvira Elliott, Lansing; second premium, Mrs. P. V. Aldrich, Armada.

Dried Cherries—Five entries. First premium, Mrs. A. McClary, Galesburg; second premium, Mrs. R. M. Cook, Charlotte.

Dried Strawberries—First premium, Mrs. A. McClary, Galesburg; second premium, Mrs. P. V. Aldrich, Armada.

Dried Raspberries—Six entries. First premium, Mrs. A. McClary, Galesburg; second premium, Mrs. Elvira Elliott, Lansing.

Dried Blackberries—Five entries. First premium, Mrs. P. V. Aldrich, Armada; second premium, R. M. Webster, Armada.

Dried Huckleberries—Five entries. First premium, Mrs. R. M. Cook, Charlotte; second premium, R. M. Webster, Armada.

Dried Quinces—First premium, Mrs. R. M. Cook, Charlotte; second premium, R. M. Webster, Armada.

Dried Currants—Six entries. All the exhibits very fine indeed—First pre-

mium, R. M. Webster, Armada; second premium, Mrs. P. V. Aldrich, Armada.

Dried Gooseberries—First premium, Mrs. R. M. Cook, Charlotte.

Dried Grapes—First premium, Mrs. Elvira Elliott, Lansing.

Dried Elderberries. Six entries—First premium, Mrs. R. M. Cook, Charlotte; second premium, Mrs. A. McClary, Galesburg.

Dried Crab-apples. Committee found no such class on its list, but awarded Mrs. R. M. Cook first premium.

Several discretionary premiums were awarded on dried vegetables.

DIVISION P.—CANNED AND PICKLED FRUITS.

There were seventy entries in this division, and in many instances the competition was very close.

Canned Peaches—First premium, L. E. Nabors, Flint; second premium, Mrs. P. V. Aldrich, Armada.

Canned Pears—First premium, R. M. Webster, Armada; second premium, L. E. Nabors, Flint.

Canned Apples—First premium, R. M. Webster, Armada.

Canned Plums—First premium, Miss Maggie Currie, Detroit; second premium, R. M. Webster, Armada.

Canned Cherries—First premium, Miss Maggie Currie, Detroit; second premium, L. E. Nabors, Flint.

Canned Crab-apples—First premium, Mrs. P. V. Aldrich, Armada; second premium, L. E. Nabors, Flint.

Canned Strawberries—First premium, Mrs. A. McClary, Galesburg; second premium, L. E. Nabors, Flint.

Canned Raspberries—First premium, L. E. Nabors, Flint; second premium, R. M. Webster, Armada.

Canned Blackberries—First premium, L. E. Nabors, Flint; second premium, Mrs. P. V. Aldrich, Armada.

Canned Huckleberries—First premium, L. E. Nabors, Flint; second premium, R. M. Webster, Armada.

Canned Quinces—First premium, L. E. Nabors, Flint; second premium, Mrs. R. M. Cook, Charlotte.

Canned Gooseberries—First premium, L. E. Nabors, Flint.

Canned Currants—First premium, L. E. Nabors, Flint; second premium, R. M. Webster, Armada.

Canned Grapes—First Premium, Mrs. P. V. Aldrich, Armada; second premium, R. M. Webster, Armada.

Pickled Pears—First premium, R. M. Webster, Armada; second premium, Mrs. P. V. Aldrich, Armada.

Pickled Peaches—First premium, Miss Maggie Currie, Detroit; second premium, L. E. Nabors, Flint.

Pickled Apples—First premium, L. E. Nabors, Flint; second premium, Mrs. P. V. Aldrich, Armada.

Pickled Cherries—First premium, Mrs. P. V. Aldrich, Armada; second premium, L. E. Nabors, Flint.

Several special premiums were recommended upon canned vegetables shown by L. E. Nabors.

DIVISION Q.—PRESERVED FRUITS AND JELLIES.

There were above 90 entries in this division.

Collection Preserved Fruits and Jellies—First premium, R. M. Webster, Armada.

Cider Apple Sauce—First premium, Mrs. R. M. Cook, Charlotte; second premium, L. E. Nabors, Flint.

Preserved Pears—First premium, R. M. Webster, Armada; second premium, Mrs. R. M. Cook, Charlotte.

Preserved Peaches—First premium, R. M. Webster, Armada; second premium, Mrs. R. M. Cook, Charlotte.

Preserved Plums—First premium, Mrs. Elvira Elliott, Lansing; second premium, Mrs. P. V. Aldrich, Armada.

Preserved Cherries—First premium, R. M. Webster, Armada; second premium, Mrs. P. V. Aldrich, Armada.

Preserved Strawberries—First premium, Mrs. A. McClary, Galesbury; second premium, Mrs. P. V. Aldrich, Armada.

Preserved Raspberries—First premium, R. M. Webster, Armada; second premium, Mrs. P. V. Aldrich, Armada.

Preserved Blackberries—First premium, R. M. Webster, Armada; second premium, Mrs. P. V. Aldrich, Armada.

Preserved Huckleberries—First premium, Mrs. P. V. Aldrich, Armada; second premium, Mrs. A. McClary, Galesburg.

Preserved Quinces—First premium, R. M. Webster, Armada.

Preserved Currants—First premium, Mrs. P. V. Aldrich, Armada; second premium, Mrs. P. V. Aldrich, Armada.

Currant Jelly—First premium, Mrs. P. V. Aldrich, Armada; second premium, Mrs. P. V. Aldrich, Armada.

Apple Jelly—First premium, Mrs. P. V. Aldrich, Armada; second premium, Miss Sara Fletcher, Ann Arbor.

Crab-apple Jelly—First premium, R. M. Webster, Armada; second premium, H. D. Cutting, Clinton.

Grape Jelly—First premium, Miss Sara Fletcher, Ann Arbor; second premium, Mrs. P. V. Aldrich, Armada.

Raspberry Jelly—First premium, Mrs. P. V. Aldrich, Armada; second premium, Mrs. A. McClary, Galesburg.

Blackberry Jelly—First premium, L. E. Nabors, Flint; second premium, R. M. Webster, Armada.

Quince Jelly—First premium, R. M. Webster, Armada; second premium, Miss Sara Fletcher, Ann Arbor.

Gooseberry Jelly—First premium, L. E. Nabors, Flint.

Strawberry Jelly—First premium, L. E. Nabors, Flint.

Plum Jelly—Second premium, L. E. Nabors, Flint.

Apple Butter—First premium, R. M. Webster, Armada; second premium, L. E. Nabors, Flint.

Several special premiums were awarded in this division, subject to action of the Executive Board.

DIVISION R.—NURSERY STOCK.

In this division L. G. Bragg, of Kalamazoo, entered in every class but grape vines. There was no competition, and because the stock was good the com-

mittee awarded first premium in all the classes. The committee were N. Chilson, Battle Creek; Eli Bidelman, Lansing; Chas. R. Coryell, Jonesville.

DIVISION S.—SCREENS.

The awards in this division were not made at the fair, and the report will appear upon a subsequent page of this volume.

DIVISION T.—PLANTS IN POTS—PROFESSIONAL LIST.

Collection of greenhouse and stove plants of not less than 20 different varieties. First premium, Frederick Schneider, Detroit; second premium, Carl Bogula, Detroit.

Six Begonias—First premium, Wm. Ferguson, Detroit; second premium, Carl Bogula, Detroit.

Six Fuchsias—First premium, Frederick Schneider, Detroit; second premium, Carl Bogula, Detroit.

Six Single Geraniums—First premium, Carl Bogula, Detroit.

Six Double Geraniums—First premium, Carl Bogula, Detroit.

Six Coleus—First premium, Carl Bogula, Detroit.

Single Agave—First premium, George Beard, Detroit.

Four Azalias—First premium, Frederick Schneider, Detroit.

Single Caladium—First premium, Frederick Schneider, Detroit.

Single Dracæna—First premium, Wm. Ferguson, Detroit.

Single Foliage Begonia—First premium, Frederick Schneider, Detroit; second premium, Carl Bogula, Detroit.

Single Flowering Begonia—First premium, Carl Bogula, Detroit; second premium, Frederick Schneider, Detroit.

Single Alocasia—First premium, Frederick Schneider, Detroit.

Single Coleus—First premium, Frederick Schneider, Detroit.

Single Fuchsia—First premium, Carl Bogula, Detroit; second premium, Frederick Schneider, Detroit.

Specimen Double Geranium—First premium, Carl Bogula, Detroit.

Specimen Single Geranium—First premium, Carl Bogula, Detroit.

Single Bouvardia—First premium, Carl Bogula, Detroit.

Single Nérîum—First premium, Carl Bogula, Detroit.

Single Specimen Tuberosa—First premium, John Ford & Sons, Detroit; second premium, Carl Bogula, Detroit.

Single Salvia Splendens—First premium, John Ford & Sons, Detroit; second premium, Carl Bogula, Detroit.

Single Tree Fern—First premium, Wm. Ferguson, Detroit.

Single Fern—First premium, Frederick Schneider, Detroit.

Single Azalea—First premium, Frederick Schneider, Detroit.

Four Double Petunias—First premium, Frederick Schneider, Detroit.

Plumbago Capensis—First premium, John Ford & Sons, Detroit.

Single Carnation—First premium, George Beard, Detroit.

Climbing plant on trellis—First premium, Frederick Schneider, Detroit.

DIVISION U.—PLANTS IN POTS—AMATEUR LIST.

By some misfortune the note was not made in the catalogue of premiums that this was strictly an amateur list, and hence some professionals take premiums; but the committee found that there was such an arrangement of entries as to prevent any unpleasantness growing out of this fact, and hence did not throw any of them out.

Six Carnations—First premium, Frederick Schneider, Detroit.

Six Pinks, different varieties—First premium, George F. Crabbe, Detroit.

Specimen plant, Lady Washington Geranium—First premium, Frederick Schneider, Detroit.

Specimen plant, Salvia—First premium, George F. Crabbe, Detroit.

Specimen plant, Foliage Begonia—First premium, Mrs. Adah Paris, Detroit.

Specimen plant, Flowering Begonia—First premium, Frederick Schneider, Detroit.

Specimen plant, Coleus—First premium, Frederick Schneider, Detroit; second premium, Mrs. Adah Paris, Detroit.

Specimen plant, Carnation—First premium, Frederick Schneider, Detroit; second premium, George F. Crabbe, Detroit.

Specimen plant, Fuchsia—First premium, Frederick Schneider, Detroit.

Specimen plant, Primrose—First premium, Frederick Schneider, Detroit.

Specimen plant, Tuberosa—First premium, Mrs. Seth Smith, Detroit.

Specimen plant, Tree Fern—First premium, Mrs. Seth Smith, Detroit.

Specimen plant, American Cotton Plant—First premium, Mrs. Stephen Long, Detroit.

Specimen Plant, Jerusalem Cherry Tree—First premium, R. J. Cary, Detroit.

Specimen Plant, Agave—First premium, Miss Adelaide Kaicher, Detroit.

Specimen plant, Myrtle Tree—First premium, Frederick Schneider, Detroit.

DIVISION V.—BEDDING PLANTS AND CUT FLOWERS.

The arrangements for showing the entries in this division were very unsatisfactory. There were above fifty entries, some of which could not be found by the committee.

Display of Cut Flowers—First premium, James Toms, Ann Arbor; second premium, Miss Sara Fletcher, Ann Arbor; third premium, George F. Crabbe, Detroit.

Twelve Verbenas—First premium, James Toms, Ann Arbor; second premium, George F. Crabbe, Detroit.

Twelve Dahlias—First premium, John Ford & Sons, Detroit; Second premium, James Toms, Ann Arbor.

Twelve Gladiolus—First premium, John Ford & Sons, Detroit.

Twelve Chrysanthemums—First premium, Carl Bogula, Detroit; Second premium, Mrs. R. M. Cook, Charlotte.

Twelve Roses—First premium, James Toms, Ann Arbor.

Twelve Asters—First premium, Mrs. R. M. Cook, Charlotte; second premium, John Ford & Sons, Detroit.

Twelve Pansies—First premium, Mrs. R. M. Cook, Charlotte; second premium, James Toms, Ann Arbor.

Twelve Zinnias—First premium, Mrs. Wm. Prentiss, Windsor; second premium, Fred Waltz, Detroit.

Twelve Balsams—First premium, John Ford and Sons, Detroit; second premium, George F. Crabbe, Detroit.

Twelve Phlox Drummondii—First premium, James Toms, Ann Arbor; second premium, George F. Crabbe, Detroit.

Twelve Antirrhinum—First premium, Mrs. R. M. Cook, Charlotte; second premium, George F. Crabbe, Detroit.

Twelve Ornamental Grasses—First premium, Mrs. R. M. Cook, Charlotte.

Twelve 'Ten Weeks' Stocks—First premium, Mrs. R. M. Cook, Charlotte.

DIVISION W—BOUQUETS AND FLORAL DESIGNS.

There were fifty-eight entries in this division. The displays were not extensive, but some of them exceedingly fine and tastefully arranged.

Pair Bouquets of Flowers—First premium, George F. Crabbe, Detroit; second premium, Mrs. R. M. Cook, Charlotte.

Pair Bouquets of Grasses—First premium, Mrs. R. M. Cook, Charlotte.

Pair Bouquets of Everlastings—First premium, Mrs. Wm. Prentiss, Windsor.

Pair Vases with Flowers—First premium, George Beard, Detroit.

Fancy Basket of Flowers—First premium, Wm. Ferguson, Detroit, second premium, Mrs. Seth Smith, Detroit.

Design in Flowers for Center Table—First premium, Wm. Ferguson, Detroit; second premium, George F. Crabbe, Detroit.

Arranged Dish of Cut Flowers—First premium, George F. Crabbe, Detroit.

Floral Novelty—First premium, Wm. Ferguson, Detroit; second premium, George F. Crabbe, Detroit.

Pair Button-hole Bouquets—First premium, Carl Bogula, Detroit; second premium, George F. Crabbe, Detroit.

LEAF CLASSIFICATION.

In Division W were entered a number of sheets of mounted leaves, by three students at the Agricultural College, illustrating leaf classification. The arrangement was beautiful and instructive. A special committee, consisting of E. F. Guild, Saginaw; Miss Fannie Noble and Miss Hattie Owen of Detroit, were selected to report suitable awards, and reported as follows: "We have taken especial pleasure in viewing the work of Messrs. W. H. Bristol, J. E. Eddie and C. M. Weed, of Lansing, and recommend a premium of five dollars to each of them in consideration of the labor and pains taken in perfecting the display. We think it should be the policy of the society to encourage such exhibitions for decorative and educational purposes."

DISCRETIONARY PREMIUMS.

A number of discretionary premiums recommended by the committees have been awarded by the Executive Board, and others have not at the date of compiling this, been acted upon.

HORTICULTURE :

ITS BENEFITS AND WHAT IT TEACHES.

BY WILLIAM VAN BUREN.

A PAPER READ BEFORE THE INGHAM COUNTY HORTICULTURAL SOCIETY, AT
LANSING, DECEMBER 11, 1890.

Perhaps it was almost unkindness toward me on the part of the committee on programme to wait until the sweet festival of All Saints, which the church keeps on the 1st day of November in each year, had passed, before inviting me to read a paper, for it does appear that it would have been less difficult to have chosen a subject for an address to be read before a horticultural society ere the period had arrived when

“Never resting time leads summer on to hideous winter;
Sap-checked with frost, and leaves quite gone.”

However, having been invited, and having consented to write something, I am in duty bound to make an effort. If I succeed in saying anything of interest, or that will be of benefit to my hearers, I will be fully repaid for the undertaking. If I fail in these things, I hope you will attribute that failure rather to the lack of knowledge than to any want of interest on my part in the society and its future usefulness.

To begin, then, I wish to say that I joined the Ingham county horticultural society from somewhat selfish motives, and not perhaps with a knowledge that I could be of any great benefit to the members of the association, but rather hoping that I would obtain knowledge beneficial to myself. In ordinary cases self-interested promptings are not the first principles which lead one to good deeds. Yet, believing as I do that it is the duty of every man and every woman, and every boy and girl who has reached the years of discretion, to unite himself or herself with an organization having for its object the bettering of the social condition of mankind, and firmly believing that an association such as ours will lead directly in that path, I may be pardoned for my selfishness in joining. I hope, now that you have received me, that I may in some way repay you for your kindness, and at various times contribute my mite in forwarding the noble objects of our excellent society.

ONE OF THE EARLIEST EMPLOYMENTS.

Horticulture is the most ancient employment ordained by the Creator for man. In the words of Lord Bacon, "it is the greatest refreshment of the spirits of man, without which buildings and palaces are but gross handiworks, and man will ever see that when ages grow to civility and elegance, men come to build statelier sooner than to garden finely, as if gardening were the greatest perfection."

BENEFITS OF HORTICULTURAL SOCIETIES.

Societies like our own are not only powerful and effective in the advancement of science and art, but the incentive to the formation of many channels of industry, the fruits of which diffuse their blessings on every hand. Our meetings not only present facilities for social and business intercourse, but they also offer opportunities for personal friendships.

In a city like Lansing there are but few regular gardeners to aid us with their practical examples, advice, and presence at our meetings, yet there are but a limited number of cities in the land where the advantages of a knowledge of horticulture could be used to better benefit. Our broad avenues and streets, and large yards present an excellent opportunity for the display of a horticultural taste, which, once cultivated and utilized by a few even, would stimulate hundreds of others to greater efforts in the care of their surroundings. No man likes to have comparisons made when such collation reflects on himself or his property. Therefore the man who by planting sweet-scented flowers and shrubs, by building good walks about his premises, and by keeping his surroundings neat, beautiful, and clean, compels his less thrifty neighbor to do the same (although not perhaps from love of the beautiful), confers a favor on the community in which he lives that cannot be measured by words. Going out and attending to matters and things about the premises, and returning with dry, clean shoes, is an enjoyment that must be realized to be appreciated. No man can be a good horticulturist without displaying that partiality to advantage about his home; therefore, the greater number of people in a community possessing a love for horticulture, and the greater number of people who can, by the aid of such societies as ours, be induced to cultivate such a desirable taste, the more rapidly will our homes and surroundings become beautiful and attractive.

When passing a well-kept lawn, a handsome yard, or even an ordinary place, where the empty oyster-cans, old boots and shoes, and general rubbish, are properly disposed of, instead of lying in unsightly heaps, or scattered promiscuously about the back door, I always feel that a better acquaintance with the owner and his family would be desirable. To me it does not appear possible for a man to be a truly bad man at heart who keeps his surroundings in proper shape.

ADVANTAGES OF PROPER FRUIT-PACKING.

While I cannot tell you anything about the planting and general cultivation of flowers, fruits, and vegetables, which would be of advantage to you who have had years of experience in horticulture, yet, as a consumer and enthusiastic lover of some of the good things of earth, perhaps I might say a few words about marketing fruit that will prove of advantage to some.

The first requisite is a clean, attractive package. How many times have

you and I been induced to buy a quantity of berries or fruit because of the unstained and charming appearance or the box, basket, or package, and because a little knowledge of wood enabled us to see at once that the berries or fruit had been packed in dry, well-seasoned boxes. Fruit is easily affected by odors, and sooner decays when in contact with moisture than when shipped in a thoroughly seasoned package. Fruit boxes and baskets, therefore, should be procured early in the season, in order that ample time may be had for them to dry and be ready for the fruit when ripe. Good and bad fruit should not be shipped in one package. Whatever the fruit, let it be uniform in size and color.

A story, which to me seems appropriate here, is told of a gentleman who bought a barrel of apples of a certain dealer, which did not give satisfaction. The following conversation is said to have taken place at the next meeting of the buyer and seller:

"What's the reason," said the buyer, "that the further down I go into the apples, the worse they get?"

"The reason for that is," replied the seller, candidly, "that you did not open the barrel at the other end. If you had only done that the apples would be getting better all the time."

I am quite certain that enough fruit has been packed in that way in the past to make the story quite probable. I believe, however, that there has been a marked improvement in this respect during the past few years.

It does not take any more time to secure a good customer for fruit and berries than to obtain one for butter, cheese, or wood. When a buyer knows that he can secure a good article of fruit, berries, or garden stuff, from a certain grower, he is just as faithful a customer, and just as willing to pay a fair price, as the one who buys the other commodities mentioned above.

If the ultimate object of raising fruit for market is to obtain the most money for it possible, I know of no better way than, first, to raise good fruit, and second, to market it in the most attractive manner. Produce thus cultivated and marketed will speak to your praise in every good quality you have imparted to it, and win the notice and good will of those who are seeking good workmen, and are willing to pay for quality.

If on a cold, dark night you observe a man wending his way to the abode of one of God's poor children, with a heavy load of provisions in his arms, you need not stop to ask if he loves the Lord. Whether he is an orthodox, a Catholic or a heathen, he is laying up treasures in heaven. When you see a fine lot of fruits or berries put up in proper shape, and brought to market fresh and inviting, you need not stop to inquire how long the cultivator has been engaged in the operation, but rest assured that he understands his business thoroughly. That producer will make a good member of a horticultural society, and the more we have of that class in our ranks, the better we will prosper as an organization.

WORK WELL DONE IS BEST DONE.

"Whatever is worth doing at all is worth doing well," is an old and trite maxim, but probably nothing truer was ever uttered. It is the corner-stone, as it were, of a temple of perfection, and a character builded upon such a base, although it may not perhaps be entirely faultless, can hardly be a failure. To do work well is a discipline of the heart as well as the hands and brain, and without discipline of some kind, the talents of the average human being would be only so much bankrupt stock,—not worth first value in the market.

THE VALUE OF DISCIPLINE.

But it is not necessary that a boy should learn Greek and algebra at school in order to receive this needful and healthful drill of mind and character. Any occupation engaged in, in the proper spirit, may be made to furnish both discipline and pleasure. To do the one thing only, and do it well, thoroughly, and conscientiously, to learn the one lesson until it is perfectly understood, is better far than a little knowledge of many things. Doing one thing well is an inspiration to do others well; and self-reliance, decision of character, and promptness in business matters, will unerringly follow.

ALL LEARNING NOT TO BE FOUND IN BOOKS.

Education does not all come from books. Nature gives us lessons more replete with wisdom than the lore of the sages; pictures more beautiful than the canvas of the painter or the visions of the poet; and the songs of her birds, and winds, and waters, furnish a music grander and sweeter than the songs of the artists who warble before the footlights.

WHAT HORTICULTURE TEACHES.

And what occupation is better adapted to help us explore the mystic secrets of creation, "to lead us from nature up to nature's God," than that of horticulture? The boy or man who plants a tree or makes a flower-bed, or who buries the seeds in the brown earth, has taken a broader, deeper lesson in science and religion than the one who is always housed in the school-room. No better type of the resurrection can be found than the seed bursting its bonds beneath the clod, and forcing upward the tiny shoot which gives promise of blossom and fruit. It is a lesson of patience, also, for he learns that he must await the ministering influences of the sun, the winds, and the rain, before he can reap the rewards of his labor. And, walking along the ways of the seasons, following bud and blossom to their final fruition, he sees the mighty miracle of growth in all its varied and beautiful phases. And may be, as he carefully casts out the weeds from among his plants, and prunes away unsightly and dying branches from his trees, he will be led to think of casting evil or worthless thoughts from his heart, and of pruning away excrescences of character and disposition.

And seeing that everything pertaining to the raising of his fruits and vegetables must be done at its appointed period, that in order to be fully prepared for the work of one season, he must put to good use the spare moments of its predecessor,—he learns economy of time, one of the chief factors of success in any calling.

FAILURE OFTEN A TEST OF CHARACTER.

Sometimes, of course, the results of his careful, diligent toil will not be such as he was justified in expecting. The worm, the frost, or the mildew may steal a march on him, and thwart his most cherished plans.

And just here is where we find the test of the individual's metal. If he is composed of soft material, easily affected by outside influences, he will give up, sit down and bemoan his sad fortune, and declare that he will seek some other employment that will bring him better luck. But if the genuine metal is there, you will know it by its ring, for difficulties will only serve to develop the latent force and energy of his character. He will say that what has been done can be done again, and that he will yet beat his fortune out of the earth,

as others have done before him, and will give the world an illustrated lesson in orthography by proving beyond all cavil that real, substantial, genuine luck is always spelled with a big P.

The road to success is strewn with failures, and happy is he who uses them as stepping-stones on his upward path, instead of regarding them as insurmountable barriers erected by fate to bar all progress.

HORTICULTURE BOTH POETICAL AND PRACTICAL.

And the tilling of the soil has for the dreamer its poetical side as well as its practical. If the youth who adopts it as a vocation is of a contemplative, devotional temperament, he will look upon the planting, the tending, and the gathering as sacred rights, rather than as hard, unlovely conditions of toil; he will feed his love of the beautiful on the white promises of spring, which casts its billows of bloom over orchard, garden, and meadow. He will hear the trees tell each other wonderful legends of other days, when the winds move them to speak, and he will look upon the mellow fruits of the autumn as globes of condensed sunshine and fragrance.

A GRAND FIELD FOR YOUTHFUL DISCIPLINE.

In horticultural pursuits there is one of the grandest fields for youthful discipline to be found anywhere. First, the work must be done well or it will not bring the greatest reward; second, the labor must be performed in season, or no good results will follow; and third, the youth must learn to do the work as he is instructed by those in authority, or disappointment and vexatious trials will follow each other in rapid succession. I place great stress on the last requisite, for some of my worst disappointments with boys have been caused by failure on their part to follow instructions, and do as nearly as might be as directed. Fortunate indeed is that youth or young man who early learns this important lesson; and thrice fortunate is he who, having learned the precept, puts it into daily practice, until such time as, by the display of watchful care and good judgment, advancement follows step by step, until he himself reaches the position of commander.

THE ANNUAL MEETING.

HELD IN THE CITY OF ANN ARBOR, DECEMBER
6, 7, AND 8, 1880.

FULL TEXT OF LEADING PAPERS AND ABSTRACT OF DISCUSSIONS.

Nearly a year in advance of the annual meeting of 1880 two invitations were in—one from South Haven and a second from Ann Arbor. The executive board took into consideration the fact that Washtenaw county had never been favored with a meeting, and accepted the invitation of the Washtenaw County Pomological Society. The Michigan Central Railroad granted reduced rates to delegates, and as a result the attendance from abroad was larger than ever before at an annual meeting of the society. There were nearly a hundred delegates from various parts of the State outside of Washtenaw county. Aside from this, Ontario Fruit Growers' Association was represented by Rev. Charles Arnold and William Saunders; Ohio Horticultural Society, by its honored President, Dr. John A. Warder; Western New York Horticultural Society, by J. S. Woodward and H. E. Hooker and Mr. Chase.

The exhibit of fruit was very choice, much of it having been brought out by the following announcement which had been published for some weeks:

"It is very desirable that we have a beautiful exhibit of the best winter apples, and the executive board offer the following prizes to members of the society:

"Best 5 varieties winter apples for market, \$5.

"Best 5 varieties winter apples to eat, \$5.

"Best 5 varieties winter apples to cook, \$5.

"There must be exactly five specimens of each variety, and the awarding committee will consider not only the value of the varieties for each particular purpose, but the character, beauty, freedom from defects and general perfection of the specimens. Entries must be made by mail or at Ann Arbor the afternoon of December 6. We desire a large exhibit of fruit, in variety, and, aside from the special exhibits named above, it is hoped that fruit growers will bring in from their abundance, especially of varieties regarding the names of which there may be some doubt."

J. Austin Scott, one of the pioneers in horticultural society work, said he never saw a more choice selection of winter apples than that gathered at Ann Arbor.

The arrangements for receiving and entertaining the delegates were most complete. The circuit court room was used for the meeting, and was given up for this purpose, although the court was in session. An ante-room was given

our executive board for its closed sessions, and another adjoining room was given to the display of plants and flowers by James Toms, who decorated it handsomely and made a display that added materially to the pleasures of the convention.

At half past seven o'clock on Monday evening, December 6th, President Lyon called the convention together, and the proceedings were opened by music under the charge of Prof. Alvan Wilsey.

The address of welcome, very appropriate and cordial was given by Judge Page, and responded to in a very happy vein by President Lyon.

After listening to another piece of music, Prof. W. J. Beal of the Agricultural College, delivered an address, illustrated by a number of charts, on

THE OAKS OF MICHIGAN AND THE WORLD.

He remarked in opening that his essay was full of quotations. Instead of avoiding them, he had made as many as he could, giving the exact words of the authors. This kind of mosaic work of quotations had taken much more time than would have been required to write an essay without quotations.

The main authors consulted were Loudon, Emerson, Michaux, and A. J. Downing.

"The oak is distinguished from all other trees by its acorn, for which the fruit of no other tree can be mistaken." The leaves are late in appearing, just before or just with the flowers. The stipules fall away as the leaves expand the buds. The flowers are of two kinds, both on one plant. "The sterile flowers are in long, slender drooping catkins, which are in clusters; the fertile flowers in a bud-like, scaly cup." The sterile flowers contain the pollen for fertilizing the embryo acorns, and fall away as soon as the pollen is shed. The young acorn contains three cells, and each cell two ovules. But one ovule, sometimes two in each acorn, usually develops into an embryo. Botanists met with little difficulty in distinguishing the species of oaks till those of America began to attract attention. "The American sorts vary so exceedingly in their leaves at different seasons of the year, in different stages of their growth, and in different localities, that it is next to impossible to fix on a specific character, taken from them, which shall remain constant." This is in some cases, doubtless, owing to hybrids or cross between two forms which are generally quite distinct.

Oaks are quite easily and naturally separated into two groups by the time required for each to ripen its fruit. The white oak may be taken as the type of the first group, and ripens its fruit in autumn of the first year; the red oak as the type of the second group, and ripens its fruit in autumn of the second year. The leaves of the first group in our species are destitute of bristly points; some of those of the second group have bristly pointed teeth on the margins of the leaves. The acorns of the first group are more or less sweet to the taste; of the second group, bitter. The wood of the first group is generally much the more durable, valuable, and fine grained.

The nearest relatives of the oaks in our country, or with which most of us are familiar, are chestnuts and beeches; the next nearest, the iron-woods, blue beeches, and hazels; the next, the birches and alders.

The above, with a few others, taken together, constitute what is termed a family or natural order.

So far as discovered in the whole world, there are about 400 species in the entire family. There are 25 birches, 14 alders, 9 hazels, 1 *ostryopsis*, 2 iron-woods,

7 hazels and filberts, 25 species of castanopsis, which is a chestnut-like plant, 2 chestnuts, 15 beeches, and nearly 300 oaks. Three-fourths of the species in the family are oaks, hence it is very properly called the oak family.

"The oak belongs exclusively to climates temperate either by their latitude or their elevation." "De Candolle, in the 'Prodromus,' published in 1868, describes 281 oaks, of which 33 or 34 are found within the limits of the United States, 90 in Mexico and Central America, 21 in Europe, 2 in Africa, 28 in China and Japan, 60 in continental Asia, 26 in Java, 14 in Sumatra, 6 in Hong-Kong, 3 in Borneo, 1 in Moluccas. Since then, others have been found on the Pacific Slope, within the United States." "In Britain, two species only are indigenous; in France, there are four or five sorts, and in Italy, Greece, and Spain, six or seven."

White oak (*Quercus alba*) is by far the most important oak in Michigan or in the United States.

Michaux reports it in Canada as far north as 46° 20'. In Michigan it reaches Grand Traverse Bay and perhaps extends farther north.

Scarlet oak (*Quercus coccinea*) is also very common in our State, reaching Grand Traverse Bay at the north.

Bur-oak (*Quercus macrocarpa*) is common on low, rich timbered land, and on rich openings in the southern part of the State, extending north, perhaps nearly to Howard City. C. F. Wheeler of Hubbardston says, "It is quite abundant in the Grand River Valley and the rich plains in the vicinity."

Swamp white oak (*Quercus bicolor*) is common on low ground and in the southern counties becomes a large, tall tree, of great value for posts and sills.

Yellow chestnut oak (*Quercus muhlenbergii*) is found sparingly along streams, with about the same range as swamp white oak. It is not abundant anywhere in Michigan.

Laurel oak (*Quercus imbricaria*) is found in Lenawee and Branch counties and probably elsewhere. The leaves are lanceolate—oblong with entire margins, much resembling the leaves of the laurel.

Black oak, or yellow-barked oak (*Quercus coccinea*, variety *tinctoria*) is quite common on poor land and on rich land.

Red oak (*Quercus rubra*) is a large, coarse grained tree of little value, common on low land, extending into the Upper Peninsula.

Pin or swamp Spanish oak (*Quercus palustris*) is reported by the late Dr. Cooley and by Mr. Wheeler as a rare tree. It would be useless here to go into the details of classification.

I have named nine species as found in Michigan. Perhaps there are others. I do not wonder that there is much confusion in the minds of people who are not botanists, in reference to our oaks. Botanists are also much puzzled. Considering the small number of species, there is probably no more troublesome genus of woody plants in our State, not even excepting the willows. The best way that I know of to settle some of these knotty questions is for some one to plant seeds and raise the trees and watch the results. Attempts to cross the species would also be valuable.

"The red oak is the most northern of oaks. It extends from Georgia to the Saskatchewan." "No other oak flourishes so readily in every situation; no other is of so rapid growth; no other surpasses it in beauty of foliage and of trunk."

"In Norway the oak is found at north latitude 60°, in Finland still higher."

"The oak is never found in perfection except in a good soil, and in a temperate climate."

"On account of its uses, the white oak is the most valuable of our trees."

The best white oak of our State is confined to the two southern tiers of counties. Wagon-makers of Lansing tell me that it is with considerable difficulty that they get good white oak spokes in the central or northern part of the State. The best spokes come from Indiana and Ohio.

Live oak (*Quercus virens*) has evergreen leaves much the shape of those borne by the laurel oak. The species is confined to the southern States near the Atlantic and Gulf of Mexico. It will not grow in the open air much north of Virginia. It does not often attain a large diameter nor a great height. It often branches near the ground. "The wood is very strong, and incomparably more durable than the best white oak, and is highly esteemed in ship-building." The wood is very heavy. The tenacity of the leaves of other oaks in winter in the temperate zone shows a tendency to become evergreen.

The English oak (*Quercus robur*) is much like our white oak in appearance and value.

"According to popular tradition, William Rufus was the first who is recorded to have planted oak trees, when, in 1079, he formed the new forest in Hampshire."

The acorns may be kept over winter in sand which is nearly dry, or in sphagnum. It is usually the safest way to plant the acorns as soon as ripe where the trees are wanted.

If they are well transplanted when they are a year old, there is no difficulty in moving them after that within five or six years. When moving it is a good plan to dig deep and get a long top root. Root-pruned trees are the only trees safe for transplanting except those which are very young.

Oaks are not easily budded or grafted with success. Inarching is practiced to propagate some of the most interesting varieties.

As soon as acorns fall, especially have I noticed this in the white oak, the radicle pushes out from the covering, and from its extremity a root descends before winter for several inches into the soil. In the spring following, the plumule pushes upward and begins to form the ascending axis. Oaks use the materials of the thick cotyledons to get a good firm hold in the soil before they venture to put forth leaves and branches.

Oak grubs are very tenacious of life, as many a farmer knows. They may sprout many times and still live.

The oak grows slowly in the early stages of its life, and requires a hundred or one hundred and fifty years or more to come to perfection and maturity. "The average growth of the white oak is not far from two inches in diameter in ten years after it has been growing thirty years." "After that age there are about ten circles to an inch." "The red oak, after thirty-five years, increases at the rate of about two inches in diameter every eleven years."

The young growth of all oaks is impatient of spring frost. A thrifty oak 80 years old gains more in ten years than it did in the first thirty. In Great Britain and on the continent of Europe, oaks grow and flourish for centuries. At the Agricultural College, our scarlet oaks of three year's growth from acorns are much larger than the white oaks. The latter are still quite small and straggling. Bur-oaks have grown a little faster than white oaks for a few years. For posts, I should prefer growing red cedar or locust to growing white oak.

This society can do a valuable work by encouraging, in all possible ways, the planting of all sorts of hardy trees. They may be planted for screens, for timber, for ornament, or for study. The work is interesting and tends to elevate and refine the person who watches and cares for the trees. The example of a

tree planter is a worthy one. The time has already come when many of us are glad to find samples of many species and varieties to learn of their fitness for our climate. At the Agricultural College we are growing about two hundred and seventy-five or three hundred of the hardiest species and varieties of trees and shrubs. We shall increase the list. Many have been tried and found wanting, owing to our severe winters.

"The oak is peculiarly subject to attacks of insects, which cause a great many varieties of galls; some kind being found on almost every part of the tree." Some are hard and solid, others light and an inch and a half or more in diameter. "The most important is that known in commerce as the gall-nut," and used in large quantities for inks, dyeing, and the preparation of tannin and of gallic acids.

"Oak corn, that is, ac-cern, or acorns, some centuries ago, formed an important food, both for man and beast." In remote times, acorns in Spain were brought to table to eat, and in some cases they were ground for meal. "In Asia Minor, acorns are still sold as food." In several States of Northern Africa acorns are now used as food. Pelasgus taught the Greeks to eat acorns, as well as to build huts. Many of us still remember the great value of acorns to fatten swine when the country was new.

"In Europe, the stag, the roe-buck, and the wild boar winter upon acorns. In Asia, pheasants and the wood-pigeon share it with animals of the deer kind. In our own native forests, the bear, the raccoon, the squirrel, the wild pigeon, and the wild turkey delight in various kinds of acorns."

"In England, the tree was once only prized for the acorns which were the chief support of large herds of swine. Woods were valued according to the number of hogs they could fatten."

"The bark, leaves, and fruit, abound in astringent matter, and in tannin." "The bark of one or more species furnishes a yellow dye much used in dyeing wool and silk." The value of oak bark for tanning leather is well understood.

The cork oak (*Quercus suber*) grows in Southern Europe and Northern Africa, and is the only tree which produces cork in sufficient quantity for commerce. Cork is used for a great variety of purposes. It is supposed by some to be a modern idea to use cork in the soles of shoes, but the Roman women lined their shoes with it more than 2,000 years ago. Cork is taken from trees every eight or ten years after they are fifteen or twenty years old. Care is taken not to injure the inner bark, which would endanger the health of the tree.

"The great value of the oak, in all countries, is for its wood. It is applied to a greater variety of important purposes than that of any other tree."

"The wood of most species of oaks is comparatively with that of other trees, hard, compact, heavy, tough, and durable." It is the most valuable for many parts of heavy wagons, carriages, plows, and other kinds of machinery, for railroad ties, fence posts and rails, piles, bridges, baskets, etc., etc. It is highly ornamental for cabinet ware and for finishing the interior of houses. The wood of several species of oaks is almost indispensable for ship-building.

"The wood of white oak unites the properties of hardness, toughness, and durability, in a greater degree than any other native wood. It is very heavy, compact, and close-grained." The silver grain, when shown by being properly cut, makes the wood very ornamental.

The white oak tree roots deep and sends out few side roots near the surface. The leaves on young trees remain all winter, till the buds start in spring. On account of their deep roots, and the peculiarity of holding their leaves, many

species of oaks are well adapted for wind breaks or screens. Small trees can serve for protection, and some of these in a screen can remain to grow longer for timber.

"A red oak in Lancaster, measured, in 1840, seventeen feet in circumference at three feet from the ground." "A white oak in Greenfield, Mass., in 1838, measured seventeen feet five inches just above the root, and fifteen feet three inches at three feet." "A white oak standing nearly opposite Deacon Nurse's, in Bolton, measured, in 1840, nineteen feet just above the roots, and fourteen feet at three feet from the ground."

In the American Naturalist for 1872, Robert Ridgeway gives a very interesting account of the large trees growing in the lower Wabash valley, in Indiana. Six trees of Spanish oak averaged $120\frac{3}{4}$ feet in height, and a circumference of $17\frac{1}{2}$ feet each. The largest was 150 feet high, 75 feet to the first limb, and 20 feet in circumference. The largest bur-oak was 162 feet high and 21 feet in circumference. The largest white oak was 142 feet high, 60 feet to the first limb, and $17\frac{1}{2}$ feet in circumference. "There are more truly majestic oaks in the parks of England than are to be found in the whole cultivated portion of the United States."

"There are several oaks in England which are from 500 to 1,000 years old or upwards. There are some which are believed to have been old trees at the time of William the Conqueror."

None of these old oaks are remarkable for their height, but the circumference of the trunk and of the top is quite wonderful.

The tallest of British oaks of which I find any account is one at Studley Park. It is 118 feet high, with a girth of trunk $33\frac{1}{2}$ feet; diameter of top 96 feet.

"The Hemstead oak, near Soffron Walden, has a trunk about 53 feet in circumference; the Boddington oak in Gloucestershire measured 54 feet in circumference; the Merton oak, in Norfolk, 63 feet; and, largest of all, the Bowharpe oak, in Yorkshire, 78 feet in circumference. This largest tree, three feet from the ground, measured 48 feet around.

The greatest height of the branches, most of which are dead, is 56 feet. On account of the mild climate of Great Britain, trees often continue to live and grow for a long time after the top or trunk is much damaged by death and decay.

"An oak between Newham Courtney and Clifton, shaded a circumference of 560 yards, under which 2,420 men might have commodiously taken shelter. The immense spread oak in Norkshop Park, spread between the ends of its opposite branches, of 180 feet. It dripped over an area of nearly 3,000 square yards, which is above half an acre; and would have afforded shelter to a regiment of nearly 1,000 horse."

"Humboldt refers to an oak in the Department de la Charante Inférieure, measuring nearly ninety feet in circumference near the base."

In a new country, the pioneer is not likely to entertain any great respect or reverence for large trees. He thinks of the labor required to cut it down and get it out of the way. Perhaps he is interested in the bees which may occupy a large hollow, or the raccoons which have worn off the rough bark in making its ascent. He may think of its value for fence-rails, staves, or possibly for boards. Our forefathers had pleasant associations in reference to the famous charter oak.

There are many large or old oak trees in Europe, some of which are quite celebrated. In France, at Allonville, a large oak contains a chapel in which

divine service is held at certain seasons of the year. Another contains a large hollow in which the water often stands five feet deep.

Natural grafts of oaks are not uncommon. Frank Hodgman, of Climax, has sent an interesting specimen to the Agricultural College. It is a natural grafting of yellow oak and white oak. The top of the latter grew for some years after all connection was severed with its own roots, so there is no doubt of the real connection between the wood of these two widely different species. In early Britain, criminals were tried under an oak tree. Saxons held their national meetings under an oak. Perhaps this induced the republican party of our country to be born under the oaks of Jackson. Remarkable oaks in the old country are all named, as King Oak, Queen Anne's Oak, Queen Charlotte's Oak, Herne's Oak, Pope's Oak, Staple Hill Oak, Fairlop Oak. "For many years a fair was held beneath the shade of Fairlop Oak, no booth of which was allowed to extend beyond it. This celebrated festival owed its origin to the eccentricity of Daniel Day, commonly called 'Good Day,' who, about 1720, was wont to invite his friends to dine with him, the first Friday in July, on beans and bacon, under this venerable tree. Mr. Day never failed to provide annually several sacks of beans, which he distributed, with a proportionate quantity of bacon, from the hollowed trunk of the oak, to the crowds assembled. Mr. Day had his coffin made of one of the limbs of this tree."

"Parliament oak derives its name from a parliament having been held under it, by Edward I., in 1290." Queen's oak was so called in honor of Queen Elizabeth, who is said from this favorite tree shot a buck with her own hand. "The oak is the most majestic of forest trees. It has been represented as holding the same rank among plants of the temperate hemispheres that the lion does among quadrupeds, and the eagle among birds. In one word, it is the king of forest trees." In open places the tree becomes broader than high. Its branches are long and irregular, often gnarled and crooked. "The oak appears in all ages to have been an object of veneration,—from the time of the 'oak of Mamrè,' under which Abraham sat in the heat of the day, down to that of the Greeks, by whom it was held sacred, and the Romans, who dedicated it to Jupiter. The Druids worshipped beneath its shade."

The dry brown rustling leaves of winter, in groves of small oaks, are associated in the mind of the speaker with things which are sad and desolate. Poetry, history, mythology, romance abound in references to the oak: "The unwedgeable and gnarled oak;" "the old oaken bucket;" "Jove's own tree, that holds the woods in awful sovereignty;" "a goodly oak, whose boughs were moss'd with age;" "king of the woods;" "thy guardian oaks, my country, are thy boast;" "the monarch *oak*, the patriarch of trees;" "the oak, for grandeur, strength, and noble size excels all trees that in the forest grow;" "tall oaks from little acorns grow;" "proud monarch of the forest;"

"Woodman, forbear thy stroke!
Cut not its earth-bound ties;
Oh, spare that aged oak,
Now towering to the skies!"

———"Behold yon oak,
How stern he frowns."

"The glory of the woods."

These are a few of the sentences from the poets.

"The oak from the earliest ages has been considered as one of the most important of forest trees. It is celebrated in story and in song, in the forest and

in the field, and unrivalled in commerce and the arts. It was held sacred alike by the Hebrews, the Greeks and the Romans, and the ancient Britons and Gauls."

"The civic crown, given in the palmy days of Rome to the most celebrated men, was always composed of oak leaves."

"The Arcadians, among the Greeks, believed the oak was the first created of trees." "The oak groves of Dodona in Epirus, formed the most celebrated and most ancient oracle on record."

"There is scarcely a Greek or Latin poet, or prose author, who does not make some allusion to this tree."

"The Yule log was always of oak; and, as the ancient Britons believed that it was essential for their hearth fires to be renewed every year from the sacred fire of the Druids."

Emerson says, "as an ornament to the landscape, or as a single object, no other tree is to be compared with it, in every period of its growth, for picturesqueness, majesty, and inexhaustible variety of beauty. When standing alone, alone, it throws out its mighty arms with an air of force and grandeur, which have made it everywhere to be considered the fittest emblem of strength and power of resistance. Commonly, the oak braves the storm to the last, without yielding, better than any other tree. The limbs go out at a great angle, and stretch horizontally to a vast distance. They do not always go straight out, but crook and bend to right and left, upwards and downwards, abruptly or with a gentle sweep.

"The white oak is beautiful in every state of its growth; at first, light, slender, delicate and waving; at last, broad, massive, and grand, but always graceful. Let everyone, who has an opportunity, plant a white oak." Loudon says: "The entire tree or shrub, in the case of every species of oak, may be considered as highly ornamental. In autumn the American oaks excel all other oaks in beauty."

The oak may be called a round topped tree. "When at length it is brought to acknowledge the influence of time and becomes 'bold with dry antiquity,' no other production of the forest can be admitted as its rival in majestic and venerable decay."

Thomas Meehan says: "All oaks are amongst the most useful trees in landscape gardening. Singly, in the landscape, I know of no other tree that can be compared with the white oak. I would desire to see no better emulation in gardening than in a desire to possess the best white oak. In the fall of the year the scarlet oak bears off the palm."

Downing says: "There are no grander or more superb trees than our American oaks. We are fully disposed to concede it the first rank among the denizens of the forest. As an ornamental object we consider the oak the most varied in expression, the most beautiful, grand, majestic and picturesque of all deciduous trees. It is one of the grandest and most picturesque objects as a single tree upon a lawn, and is equally unrivaled for groups and masses."

I have had a purpose in my references to the oaks of the old world, to show how universally they were objects of respect and admiration. This spirit is truly worthy of our imitation. The masses of American people lack reverence and are especially deficient in their respect for fine trees.

In a few towns of Germany, Downing says, no bachelor can take a wife till he has planted a tree.

A part of our mission henceforth, since we have assumed the broad title of

Horticultural Society, is to do what we can to encourage tree planting in Michigan.

I can do no better than close with the following which I recently wrote for the Rural New Yorker: "There are but few farms that contain enough ornamental trees about the buildings. Trees increase the value of a place, whether the owner wishes to sell or to use it for a home. Trees shelter the dwelling and the barns from piercing winds; they add comfort and joy to man and beast; they economize the food of animals; they save fuel in the sitting room; they harbor birds; they afford shade in summer. Plant trees for yourself, for your wife, for your children and grand children. Plant trees as a good example to your neighbor and the stranger who passes by your farm. Plant trees as a monument to your memory. They will grow and remind others who come after you of the generous hand who planted and cared for them."

Following Prof. Beal's address, Prof. J. B. Steere of the State University read a valuable paper, illustrated by a collection of specimens, on

THE MIGRATION OF MICHIGAN BIRDS.

In a state of nature, animal and plant life seem almost exactly balanced against each other. The oaks and the walnuts of the forests and the grasses and flowers of the plains, after they have full-fed those that feed upon them, still have fruit enough left to keep up their species. One of the great laws of life is this: that the individuals of no one species shall be too abundantly produced, and so there shall be room and food for all species. It is probable that there are continual vibrations from this balance of life, which finally lead to the extermination of some species and the bringing in of others; but these changes are self-regulated and too slow in their action to be noticed by man.

But man himself upsets this balance wherever he plants his foot. He cuts down the forests and plants the cleared lands to strange vegetation from other countries. He drains the marshes, and the lakes and valleys are filled up by the soil washed down from the bared hills. By these rapid and violent changes the wind currents are disturbed, and the rain fall and temperature are interfered with. Every one of these changes strikes directly at the harmony of animal and plant life. Some species of insects and larger animals are exterminated altogether. Others from increased food or from the destruction of their enemies, multiply to immense swarms and hordes that threaten to devour everything; and, as if the native species were not sufficient to contend with, man himself introduces many from other lands. And even when the entire destruction of his crops is not threatened, civilized man is not content to make himself a part of this great harmony of nature, and to share with the rest of life, allowing the weevils and the cut worms and the caterpillars to take their part of the crop, but he covets it all. He desires all his wheat heads to be full, all his apples free from worms and all his potato tops untrimmed, and so he has war, unceasing war with insect life.

In this bitter struggle, birds are man's natural and most readily observed allies. The ichneumon-fly may fill the skin of the cabbage worm with eggs, while it hangs moulding the chrysalis which shall be its coffin. The lady-birds may destroy the potato bugs, the frost may kill the eggs of the grasshoppers, and so our enemies may vanish. But these results are produced silently and unnoticed, while we can see the woodpecker as he chisels away at our apple trees in his search after the borers; and we can hear the vireos in our trees as they sing their undeserved thanks after each caterpillar, which hardly checks their song on its way down their throats. Their good works are known and

spoken of among men. And so everything about these light, airy creatures, that hardly deign to touch our earth with the tips of their toes, becomes of interest to us.

But the objects of this society are practical and economical, and we must pass by the merely interesting, to subjects that have more immediate connection with the material welfare of man. A species of birds, to be of practical value to the farmer and fruit raiser, must possess the four following characteristics: First, they must be abundant; a pair of cuckoos in the wood-lot, or a single pewee with its nest under the shed, may do their best, but they will make no impression upon the sea of insect life. Second, they must live upon our insect enemies. The snipe, probing for worms among the bogs, or the kingfisher rattling along over the mill-pond, will be but little help in our time of trouble. Third, they must bear man's presence. The woodthrush and the oven bird, skulking in the deep woodland, will do nothing for us in a direct way; and fourth, they must stay with us for some considerable time. Those birds which nest in the far north and winter in the south, may snap up a few insects on their hurried way through our orchards and groves; but they will be hardly felt for good.

Birds then must be abundant. They must be fearless of man's presence. They must live on those insects which are directly injurious to man, and they must stay a sufficient length of time to make their services of value. All of these are subjects well worth the study of the naturalist and the agriculturist, for they are all all-important in the utilitarian sense. A species which lacks any one of these is useless.

The food of birds has already received considerable attention, and we can know within reasonable limits what help to expect from the different groups. But it is not even all insectivorous birds which are useful. Some live upon insects which are not injurious, and some even devote themselves to insects which are carnivorous and thus destroy our friends. Others are only insectivorous at certain seasons, while at other times their taste for fruit or grain may more than outweigh their good deeds.

The subject of the relative abundance of the various species of birds has, as yet, received no attention, in my knowledge; but the most casual observer cannot fail to see that some species are always more abundant than others, and there can be no doubt that there are fixed causes governing these matters. A scale could be formed of the relative abundance of the different species in any locality, and this would be true for one year after another. There is in this locality, perhaps, one pewee and one orchard oriole to two kingbirds, to two brown thrushes, to four bobolinks, to four Baltimore orioles, to eight bluebirds, to twenty robins, to thirty chipping sparrows. While we are estimating birds for what they eat, the quantity eaten becomes the matter of most importance, and this depends especially upon the number of the eaters.

The subject of birds' adaptability to man's presence is also one which I have not seen discussed, but which becomes of the utmost importance in treating of their usefulness. Some of our birds so detest the presence of man that they take shelter from him in the most impenetrable woodlands and swamps, and when dwellings and towns become too frequent they even desert their old homes altogether. Others, from the first, love man's protection and society, and soon come to build their nests in the hollow stumps and in the corners of the rail fence of the backwoods settler, and then they increase as the people increase, and grow up with the towns, and become polished citizens, looking out unconcernedly from their nests in the shade trees and porches upon the dust and

turmoil of business. A part of these, though loving association with man, are more rustic in their tastes, preferring the quiet life of the farm, where they nest about the buildings and under the brown eaves of the barn or in the scattered shade trees of the fields. And these differences in bird likings are not mere vulgar matters, depending upon food or proper nesting places, but seem to be of deeper significance, and are perhaps akin to human likes and dislikes. It is from these man-loving birds that our help must come, and a study of the the habits of intimacy or estrangement of the various species cannot but be of great value.

But these questions must be left with this hurried glance, while we take up the subject of the length of time which the various species remain with us, and incidentally, why they leave us and where they go.

My study of Michigan birds has been of those of the southern and central parts of the lower peninsula, but the inferences drawn will apply, with but little change, for all of the State below the Straits of Mackinaw.

Migration is a term applied to regular periodic changes of location in animals; this movement being only found, to any extent, in birds and fishes. In birds it exists only in those occupying temperate and cold climates; those of tropical countries being nearly or quite stationary. The migratory instinct is also found most perfectly developed in those birds whose foods are produced only during warm weather. The vireos and warblers, whose food is chiefly soft insect larvae which feed on green foliage, move to the south with the first frosts. The robins that feed, to quite an extent, on fruits and earthworms, do not move southward until the ground freezes or is covered with snow. It is not then so much cold, as the lack of suitable food, which causes the migration of birds. They can become fitted for changes of weather by warmer coats of feathers, but the nature of their food is of deeper significance.

We could perhaps, better understand some of the phenomena of migration if we could imagine a giant sower gathering the birds together from the north country in the fall and throwing them at one mighty cast to the south, and then in the spring throwing them back to the north. But to represent the migration of such birds as our robin, he would have to stand in southern Ohio and the casts to the north and south would overlap at his feet; while to represent the migrations of the warblers, he would have to stand away to the north of Lake Superior and throw them clear over the United States into Mexico and Central America.

But a better idea of migration would probably be gained if one could think of the individual birds of any one species as fixed in a movable frame, which should move back and forth spring and autumn. It is probable that where a migratory species is called resident, the birds found during the winter are those which have nested far to the north, and not those which nested in the locality itself; the birds thus keeping something like the same relative position to each other both in their nesting and wintering habitats. It seems probable that no two species of birds have exactly the same habitat, their migrations differing in extent north or south, or their habitats differing in breadth east and west.

The birds of Oregon and the west coast usually follow their own line of migration to the west of the Rocky Mountains, as far at least as Mexico.

All the birds of North America which enter South America in their migrations, probably do so by way of the Isthmus of Panama, and return by the same way, the various allied species separating on their return to the north and each going to its own place.

Most or all birds of extended migration find, on their way or at their southern limit, species closely allied to them which are not migrants.

The migratory birds which find the great lakes in their track, probably mass together at the narrower parts and cross there, as the birds of Europe do in crossing the Mediterranean.

Few or no migratory birds nest at the southern limit of their migration.

The home of a species of birds is usually supposed to be where it nests and raises its young, the journey to the south being considered merely an accident or incident of bird life.

The birds of Michigan may be divided from their migratory habits into four groups: first, those birds which nest here, and remain here winter and summer; second, those which nest here and spend the summer here, but retreat to the south to spend the winter; third, those birds which nest to the north of us and winter to the south, being only seen here for a short time in the spring and fall, during their migration; and fourth, those birds which nest to the north of us and pass the summer there, but are driven down to our latitude by the winter.

In the first group (see list A, which follows this paper), those birds which are constant residents of the lower peninsula, I find a list of thirty-three, twenty-seven of which certainly belong here, and six are doubtfully put in the list until further observation shall determine their place. Here are found the nuthatches and titmice, four or five finches, five woodpeckers, six owls, three hawks, and six game birds. The nuthatches and titmice are worthy of special mention from the quality of their food. They gather together during the winter in small flocks, as if to encourage each other against the inclemency of the weather and dreariness of the landscape—several species frequently feeding amicably together. They are abroad in all weathers, searching the trunks and branches of the trees over and over for the insects and larvae and eggs that may be concealed in the crevices and under the bark. Being too small to furnish a bite for the pot-hunters, they neither fear nor love man's presence, but in their wanderings in search of food are found in about equal numbers in the cities and in the deepest woods. The cedar birds and the finches also gather into flocks in winter, and give their mite of noise and motion to the lifeless world; but the nature of their food cuts them off from our deepest sympathies. The sedentary woodpeckers are as solitary in winter as in summer; but with their prying ways they must be of great value, especially the downy and hairy species, which are free to enter the orchards and yards, and even the towns in their search for food. All the six species of owls nesting here are sedentary. They are, most or all of them, fain to stay their stomachs during the summer, on grasshoppers and beetles, when no more noble game offers; but if they have any appreciable value to the agriculturist it is as mousers rather than as insect eaters. Our game birds are all sedentary, unless we class the wild pigeon among them. The lower peninsula is probably the extreme limit toward the north, of the wild turkey and Virginia quail (I am not sure that they reach so far), while the prairie hen only enters the southern counties, never penetrating, as I can find, to the central part of the State. On the other hand the spruce partridge, which is never seen in the southern counties, is found in the northern third of the lower peninsula. The upper peninsula may be found to contain, with this, one or more arctic forms.

The second group of birds (see list B), those nesting in our State and passing the summer here, but retreating to the south in winter, contains the great mass of the birds with which we are most familiar. Our songsters are found

here, and those birds from which we must get our chief help in our war with insect life. Coming in early spring, as soon as the first humming or crawling thing is warmed into life, they fight it out with us on that line all summer, and do not leave us until our flying enemies have flown their last, and the crawling ones have folded themselves away for their winter's nap. I make out a list of one hundred and ten of these birds, of which eighty-one, chiefly land birds, are certain, and twenty-nine, chiefly water fowl and waders, I have marked as doubtful, as I have not verified their nesting in the State, though there is no doubt that most of them do.

Among the birds of this group of sufficient importance to be mentioned in a paper of this length, are the thrushes, five species of which, including the bluebird, nest here. They are very numerous in individuals, and are voracious feeders. The migrations of the common robin, the most abundant species of the group, are curious and instructive. It nests from arctic America to Mexico, and winters from Ohio, and sometimes Michigan, to Central America, the summer and winter residences thus overlapping for most of their extent. All of our wrens, and some six or seven warblers, belong in this group, and here also are found the five species of swallows, and six of vireos; both families being of inestimable value to man, and with no set-off of grain or fruit destroyed to make our recollections of them bitter-sweet. As the forces in manly war are divided into foot and horse and artillery, each branch of the service attacking the enemy in its own way and place, so do our feathered friends. The thrushes attack upon the ground, the vireos follow up by pursuing in the trees, and the swallows wheel and circle and charge upon those which have taken refuge in the air. So fixed are these families in their methods of food-taking that they would probably starve to death before they would adopt any other. In this group are also found some ten sparrows and finches, usually feeding upon weed and grass seeds. They are harmless at all times, and are of great use during their season of nesting, from the curious fact that they choose out as food for their young, soft, fleshy, insect larvae. The greater part of the finches winter in the southern States, but a few species keep on to Mexico and South America. Among these are two of our brightest birds, the rose-breasted grosbeak and indigo bird, which seem to dress themselves up in these bright feathers that they may not seem out of place among the bright birds of the tropics.

The next family, that of American starlings—the blackbirds, bobolinks, and orioles—contains birds which are omnivorous in their foods, and though at some times they may be of great service in their destruction of insects, at others they destroy grain enough to make them of doubtful value, when their accounts are fairly balanced. The bobolink, after nesting in our meadows, hastens toward the south as soon as his family are able to be moved, this usually occurring in August, before other birds have thought of winter. But the bobolink has in mind the rice fields of the southern States, where he remains and fattens for a month or two before he takes his final departure for Central and South America. It is probable that the bobolink remains but a short time at the other limit of its migration, and so passes nearly its whole time in moving from the La Plata to the Saskatchewan. This is probably the greatest extent of migration reached by any species. The orioles also winter in South America, and it is probable that they leave for the south much earlier than most migratory birds, though I have seen no observations of their habits in this respect. Of the five or six flycatchers nesting with us, the kingbird and great-crested flycatcher winter in South America, where they are found associated with allied

species, while the pewee and the other smaller species stop in the southern States. The flycatchers take their prey on the wing, not as the swallows do in open chase over the fields and lanes; but lying in wait, like the cats, they dash out from their perch and seize their prey and bear it back to a secure place to be eaten. They frequently have two perches at a convenient distance from each other and pass their time in flitting back and forth from one to the other, taking an insect at each flight.

Our goatsuckers,—whippoorwill and nighthawks,—have also migrations of great extent, going south to Central America, where they meet several other species of their own race.

Another bird remarkable for its migrations is our only species of humming bird, the ruby throat. This bird nests as far north as the Red river and Hudson's bay, but winters in South America, as far down as the Amazon and equator. It must be a strange instinct that impels this little atom of flesh, no larger than one's thumb, to leave its troops of bright cousins in the ever-blossoming jungles of the tropics, to fly over thousands of miles of mountain and valley and stream, to perch its little nest in the elms of Michigan, and to feed from the trumpets of the wild honey-suckle. One feels like questioning this much traveled little fellow of the strange lands and peoples he has visited, and welcoming him to the shadiest and coolest nooks and rarest flowers of our woodland, which he has freely chosen instead of the stately palms and bright orchids of Brazil.

I have placed our kingfisher in this list of migratory birds, but it remains with us until the streams freeze over, and then only retreats far enough to the south to find open water.

Three of our woodpeckers, the red-bellied, yellow-bellied, and flicker, or golden-winged woodpecker, are partly migratory, while the red-headed woodpecker is decidedly so, usually retreating to the south of Pennsylvania and Ohio. These partly migratory species are those which depart most widely from the ordinary food of the family, which is insect larvae, dug from decaying wood; while those species which are stationary are nearest normal in this respect.

It is probable that eight of the hawks nesting in this State are migratory, some going into South America and others only retreating a few degrees to the south. Their place is taken during the winter by two species from the north.

The movements of the wild pigeon, though it is migratory, are not so regular as to be easily studied. Those which enter the State in large communities are said to nest at least three times during the summer, first in the lower peninsula, then, perhaps in the upper, and again later in the season in British America.

There are always a few found nesting solitarily in the swamps through the State, and these are found breeding as late as the middle of September. On account of its usual gregarious habits the wild pigeon is only able to exist where there are great quantities of suitable food within reach, and the ordinary rules governing the migration of our birds seem to be entirely set aside, the species migrating and nesting now in one State and now in another, wherever food is plenty. They would be unable to exist long where the ground was covered with snow, so that there must be a north and south movement in common with the rest of the group.

The rest of the birds falling into this list are water-fowl,—waders and swimmers,—plovers, snipes, sandpipers, herons, bitterns, rails, ducks, gulls, and terns, nearly forty in number. I have made but little study of them, and

their habits can only be well known after careful observation on our lake borders.

In the third group of birds (see list C), those nesting to the north and wintering to the south, and passing through our State during their spring and fall migrations, I find sixty-eight species, of which only thirty are perching birds, the rest being water-fowl.

Here are found three thrushes, the hermit thrush, olive-backed and Wilson's. They nest from Lake Superior to the arctic circle, and winter from Mexico to Brazil, the intervening country only knowing them as migrants.

In this list is also found the greater part of the warblers, at least twenty species nesting to the north of Lake Superior, and some of them reaching the arctic circle. They usually winter in Mexico, some passing on and entering Central America, or even reaching South America, while a few turn off at Florida and winter there, or pass over into the West Indian islands. Our warblers are peculiarly American, and we have no family of more beautiful and interesting birds than these. They are all of small size and usually of bright, pleasing colors. They are all insectivorous and take their food in the trees, hurrying about through the new budding branches, as if they were in haste to be on their way to their nesting grounds in the north. Their spring migration begins here about the first of May, is at its height on the tenth, and is well over by the twentieth of that month. Their fall migrations are not so regular, and there is some reason for thinking that many retire to the south by some other route than through this State. On account of their short stay they are almost unknown to the casual observer.

Two of our finest sparrows,—the white-throated and white-crowned,—probably fall into this list, and one of the starlings—the rusty blackbird, which breeds to the north and winters in the middle States and farther south.

Among the water-fowl are the two species of swans, and some five species of wild geese. These latter, from their noisy migrations in spring and fall, are well known. They nest to the north of the United States, many of them in Alaska, others about Hudson's bay. They winter in the open waters of the United States, reaching as far south as Florida and Texas.

In the fourth group (see list D), of birds which nest to the north of Michigan and winter here, I find a list of thirty-six, of which some sixteen are certainly placed here. Half of them are finches, among them being found the snow bunting, snowbird, tree sparrow, Lapland longspur, and red crossbill.

The most abundant species of these is probably the snow bunting. They nest in arctic America and Greenland, and also in northern Europe, and move down to the south in winter in large flocks, which go scurrying over the bleak fields like the snow-squalls they follow, in both motion and color. If they are of any use, it is as gleaners of the seeds of the weeds, which stand up through the snow to accuse the farmer of careless culture.

One owl at least,—the snowy one,—and two hawks, find the climate of their northern homes so much colder, and food so much scarcer, that they consider our coldest winter weather comfortable. Most or all of the birds of this fourth group are circumpolar in their range, and common to both hemispheres.

If the lists as given are approximately correct, about two hundred and fifty species of birds visit our State.

The State of Michigan is especially favorable to the study of bird migrations. The lower peninsula, lying open on its southern border to Ohio and Indiana, must invite the birds northward through its forests, while the great lakes on each side, gradually drawing together toward Mackinaw, must mass

the smaller birds at least, at that point, where the narrow strait furnishes them a passage over to the north. The great lakes must also furnish food and a summer home to many of the rarer water-fowl, and their open waters a retreat for many others during winter.

It is hoped that this crude paper may have the effect to stimulate thought, and especially *observation* upon the migratory habits of our birds.

LIST A—BIRDS RESIDENT IN MICHIGAN.

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|---|---|
| 1. Black-capped chickadee. | 17. Hairy woodpecker. |
| 2. White-bellied nuthatch. | 18. Three-toed woodpecker—plentiful at Higgins' Lake. |
| 3. Red-bellied nuthatch—shot in Ionia and Montcalm. | 19. Great horned owl. |
| 4. Brown creeper—(?). | 20. Screech owl. |
| 5. Horned lark. | 21. Long-eared owl. |
| 6. Great northern shrike—(?). | 22. Short-eared owl. |
| 7. Loggerhead shrike—(?). | 23. Barred owl. |
| 8. Cedar bird. | 24. Pigmy owl. |
| 9. Purple finch—found in July in Montcalm. | 25. Red-tailed hawk. |
| 10. Yellowbird. | 26. Red-shouldered hawk—(?). |
| 11. English sparrow. | 27. Bald eagle. |
| 12. Crow. | 28. Carolina dove. |
| 13. Blue jay. | 29. Wild turkey. |
| 14. Canada jay—(?). | 30. Spruce partridge—northern counties. |
| 15. Pileated woodpecker. | 31. Prairie hen. |
| 16. Downy woodpecker. | 32. Ruffed grouse. |
| | 33. Quail. |

LIST B—BIRDS NESTING IN MICHIGAN AND WINTERING TO THE SOUTH.

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|--|--------------------------------|
| 1. Robin. | 36. Rose-breasted grosbeak. |
| 2. Wood thrush. | 37. Indigo bird. |
| 3. Catbird. | 38. Chewink. |
| 4. Brown thrush. | 39. Bobolink. |
| 5. Bluebird. | 40. Cowbird. |
| 6. Blue-gray gnatcatcher. | 41. Red-winged blackbird. |
| 7. House wren. | 42. Meadow lark. |
| 8. Winter wren. | 43. Orchard oriole. |
| 9. Long-billed marsh wren. | 44. Baltimore oriole. |
| 10. Yellow warbler. | 45. Purple grackle. |
| 11. Black-throated green warbler—shot in July in Montcalm. | 46. Raven. |
| 12. Chestnut-sided warbler. | 47. Kingbird. |
| 13. Oven bird. | 48. Great-crested flycatcher. |
| 14. Titlark or wagtail—(?). | 49. Pewee. |
| 15. Maryland yellow-throat. | 50. Wood pewee. |
| 16. Red start. | 51. Acadian flycatcher. |
| 17. Scarlet tanager. | 52. Least flycatcher. |
| 18. Barn swallow. | 53. Whippoorwill. |
| 19. White-bellied swallow. | 54. Nighthawk. |
| 20. Eave swallow. | 55. Chimney swift. |
| 21. Bank swallow. | 56. Ruby-throat hummer. |
| 22. Purple martin. | 57. Kingfisher. |
| 23. Red-eyed vireo. | 58. Black-billed cuckoo. |
| 24. Brotherly-love vireo. | 59. Yellow-billed cuckoo. |
| 25. Warbling vireo. | 60. Red-bellied woodpecker. |
| 26. Yellow-throated vireo. | 61. Yellow-bellied woodpecker. |
| 27. Solitary vireo. | 62. Flicker. |
| 28. White-eyed vireo. | 63. Duck hawk. |
| 29. Grass finch. | 64. Pigeon hawk. |
| 30. Swamp sparrow. | 65. Sparrow hawk. |
| 31. Song sparrow. | 66. Cooper's hawk. |
| 32. Chipping sparrow. | 67. Sharp-shinned hawk. |
| 33. Field sparrow. | 68. Broad-winged hawk. |
| 34. Lark finch. | 69. Marsh harrier. |
| 35. Black-throated bunting—a new-comer in our southern counties. | 70. Fish hawk. |
| | 71. Wild pigeon. |
| | 72. Killdeer plover. |

73. Wilson's plover—(?).
74. Ayocet—(?).
75. Stilt—(?).
76. Wilson's phalarope—(?).
77. Woodcock.
78. Wilson's snipe.
79. Willet—(?).
80. Solitary tattler—(?).
81. Spotted sandpiper.
82. Bartramian sandpiper—(?).
83. Long-billed curlew—(?).
84. Great blue heron.
85. Green heron.
86. Night heron.
87. Great bittern.
88. Least bittern.
89. Sandhill crane.
90. King rail—(?).
91. Virginia rail—(?).

92. Carolina rail.
93. Little yellow rail.
94. Florida gallinule—(?).
95. Coot or mudhen.
96. Mallard duck.
97. Black duck—(?).
98. Gadwall—(?).
99. American widgeon—(?).
100. Blue-winged teal.
101. Shoveller—(?).
102. Wood duck.
103. Ruddy duck.
104. Goosander.
105. Hooded merganser—(?).
106. Laughing gull—(?).
107. Royal tern—(?).
108. Wilson's tern—(?).
109. Roseate tern—(?).
110. Least tern—(?).

LIST C—BIRDS WINTERING TO THE SOUTH OF MICHIGAN AND NESTING TO THE NORTH,
BEING ONLY KNOWN IN THE STATE AS MIGRANTS.

1. Ruby-crowned kinglet.
2. Hermit thrush.
3. Olive-backed thrush.
4. Wilson's thrush.
5. Black-and-white creeper.
6. Blue golden-backed warbler.
7. Worm-eating warbler.
8. Blue golden-winged warbler.
9. Nashville warbler.
10. Orange-crowned warbler.
11. Tennessee warbler.
12. Black-throated blue warbler.
13. Cerulean warbler.
14. Yellow-rumped warbler.
15. Blackburnian warbler.
16. Black-poll warbler.
17. Bay-breasted warbler.
18. Black-and-yellow warbler.
19. Palm warbler.
20. Pine-creeping warbler.
21. Water thrush—(?).
22. Large-billed water thrush—(?).
23. Hooded flycatcher.
24. Green black-capped flycatching warbler.
25. Canadian flycatching warbler.
26. White-throated sparrow.
27. White-crowned sparrow.
28. Rusty grackle.
29. Bullhead plover.
30. American golden plover—(?).
31. Ring plover.
32. Northern phalarope—(?).
33. Red phalarope.
34. Red-breasted snipe—(?).

35. Stilt sandpiper—(?).
36. Semi-palmated sandpiper.
37. Least sandpiper.
38. Jack snipe.
39. White-rumped sandpiper—(?).
40. Purple sandpiper—(?).
41. American dunlin—(?).
42. Red-breasted sandpiper—(?).
43. Great-marbled godwit—(?).
44. Hudsonian godwit—(?).
45. Greater yellow-shanks—(?).
46. Lesser yellow-shanks—(?).
47. Buff-breasted sandpiper—(?).
48. Hudsonian sandpiper—(?).
49. Esquimaux curlew—(?).
50. Trumpeter swan—(?).
51. Whistling swan—(?).
52. White-fronted goose.
53. Snow goose.
54. Blue goose—(?).
55. Canada goose.
56. Black brant—(?).
57. Pintail duck.
58. Green-winged teal.
59. Big blackhead.
60. Little blackhead.
61. Ring-necked duck.
62. Redhead duck.
63. Canvas-back.
64. Butter-ball.
65. Bonaparte's gull.
66. Forster's tern—(?).
67. Common tern—(?).
68. Black tern—(?).

LIST D—WINTER VISITORS BUT NOT SUMMER RESIDENTS IN MICHIGAN.

1. Golden-crowned kinglet.
2. Snow bunting.
3. Snowbird—shot in Montcalm last of July.
4. Red-poll.
5. Tree sparrow.

6. Bohemian waxwing—reaches the southern counties in small flocks.
7. Red crossbill.
8. Pine grosbeak—(?).
9. Pine linnet—(?).
10. Great gray owl—(?).

- | | |
|-----------------------------------|------------------------|
| 11. Snowy owl. | 15. Crested grebe. |
| 12. Hawk owl—(?). | 16. Red-necked grebe. |
| 13. Great northern diver or loon. | 17. Goshawk. |
| 14. Red-throated diver. | 18. Rough-legged hawk. |

The following list of ducks, cormorants, gulls, and terns will probably be found occupying the open waters of the great lakes in winter:

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|--------------------------------|----------------------------------|
| 19. Golden eye—(?). | 25. Double-crested cormorant. |
| 20. Barrow's golden eye—(?). | 29. Pomarine jaeger—(?). |
| 21. Harlequin duck—(?). | 30. Glaucus gull—(?). |
| 22. Old wife—(?). | 31. White-winged gull—(?). |
| 23. Labrador duck—(?). | 32. Great black-backed gull—(?). |
| 24. American black scoter—(?). | 33. Herring gull—(?). |
| 25. Velvet scoter—(?). | 34. Ring-billed gull—(?). |
| 26. Surf duck—(?). | 35. Caspian tern—(?). |
| 27. Common cormorant. | 36. Arctic tern—(?). |

After listening to some stirring music the convention adjourned for the day.

Tuesday Morning Session.

The meeting was called to order quite promptly at 9 o'clock. Prayer was offered by Rev. Dr. Lockwood, followed with music by Mr. Nathan White and family.

The secretary read a communication from Secretary Ragan, of the Indiana Horticultural Society, regretting the illness of the delegate from his society, and extending a cordial invitation to the Michigan Horticultural Society to have a delegation at their annual meeting, to be held in Crawfordsville, December 21, 22 and 23.

A request was read from Secretary Tracy, of the Mississippi Valley Horticultural Society, that we elect the vice-president of that society from Michigan as provided for in a clause of their articles of association.

After considerable discussion, in which Dr. Warder, S. L. Fuller and others spoke of the work and standing of the society mentioned, the matter of appointment was referred to the executive board.

Dr. John A. Warder, President of the Ohio Horticultural Society, gave the first paper of the morning upon the topic:

LANDSCAPE-GARDENING FOR THE CEMETERY.

MR. PRESIDENT, LADIES AND GENTLEMEN: The printed announcement of this paper by your worthy secretary is perhaps somewhat unfortunate for the reader, as it may have induced you to expect more than you will receive at his hands. It may have led you to look forward in the pleasing but delusive expectation of meeting upon this occasion that *rara avis*, that phenomenal prodigy, seldom seen, in our country at least—the true landscape-gardener. Is it, indeed, so rare, you may ask, in surprise. Yes, my friends, the assertion is confidently made, for though there be hundreds who seize the title, and who boldly advertise their claims to rank as artists in this line, there are not tens who are worthy of the name of landscapists. Some of them are mere pretenders. Some of them can perhaps very well carry out a plan that has been set for them by a master, or they may imitate a piece of work that they have seen elsewhere, but which, in all probability, is utterly unsuited to the ground and to the surroundings where they attempt to execute the design of the master who originally made the plan. Then, again, through deficient knowledge of

the characters of the plants introduced for ornamentation, the gravest errors are often committed, which become painfully evident when too late to correct the mistakes.

No, my friends, he who now appears before you is not even a "land-scraper"—much less does he claim to be a master of the high art of the landscape gardener; he proposes only to indicate the necessity for more of the art for our cemeteries, and he ventures to offer a few suggestions before this intelligent body of horticulturists, upon a subject of great importance to our reputation as a people of æsthetic tastes. This is done, however, hesitatingly and rather as an amateur than as a true connoisseur. He has been painfully impressed by the gross mistakes which may frequently be detected in works of this class, even where abundant means have been expended, and often squandered, through the lack of taste and the want of knowledge in those to whom the execution had been intrusted. * * * * From the first designing of the plan and arrangement of the ground, the essential element of success is good taste, which should never be lost sight of. And, though such work is necessarily artificial, it must be in closest imitation of Nature. Such, indeed, is the lexicographer's definition of the art, and thus also it is evident that the immortal Bard of Avon understood this when he wrote:

"This is an art that doth mend Nature—change it rather—but the art is Nature."

The range of landscape-gardening is great, since it descends, on the one hand, to the planning of the limited door-yard of a city lot to the arrangement of the farm house and out-buildings, with the location of the lawn, garden and orchard, or to the planting and ornamentation of the railway station, or to the planting of avenues on the highways, and, on the other hand, it extends to the broader area of the rural cemetery, or to the still wider limits of the great park.

Landscape-gardening has a broad scope and requires an extended knowledge of many things. It embraces a familiarity with architecture, to enable the artist to direct the planning and construction of suitable buildings, gateways, bridges, terraces, arches, kiosks, obelisks, pavilions, and other ornamental structures. It requires as its fundamental basis the ability to design the grading and to direct the execution of the earth-working, the arrangements of land and water generally, and especially the drainage of the soil and the management of the result in rills, cascades, basins, lakes, and fountains. It necessitates the accurate surveys for all this, and also for properly locating the drives and walks, with their thorough construction, so that they may be of easy grades, smooth and dry, neither dusty nor muddy.

Grass, in a close green turf, is a necessity in all landscaping. This requires a knowledge of the kinds best adapted to the various soils, and the treatment most conducive to the perfect verdure and condition of each kind.

Trees and shrubs, singly and in groups, claim a high rank in the materiel of the landscape-gardener. For their proper selection and disposition it is essential that he should be perfectly familiar with their requirements as to soil and management, as well as with their habit, form, or outline, their relative size and height, as well as with the peculiar tint and disposition of their foliage, whether deciduous or evergreen. These remarks are especially applicable to the trees which are to be set singly to display their peculiar beauties and future grandeur, whether in the open spaces of the park or in the broad umbrageous avenues, which may be introduced with fine effect in parts of an extensive park or its approaches. But who shall venture to make the selection unless per-

fectly familiar with the history, present and prospective, of the several species of trees to be planted, and with their perfect adaptation to the soil in which they are planted, and also their accordance or otherwise with the surrounding objects, such as rocks, brooks, mountains and forests, or with the grassy plains and quiet waters of the lowland regions?

What has been set forth as necessary knowledge on the part of the landscape-gardener, to enable him properly to select single and avenue trees, may be applied with equal force to the selection of those trees and shrubs that are to be planted in groups and copses. The prospective and relative size of each must be known, their forms should harmonize with one another, even their peculiar tints, and the characters of their foliage should correspond with others of the group, or part of the group, and where strong contrasts are desired, in the way of a surprise, the knowledge and forethought of the planter will be taxed severely to secure the desired happy result. Then again he must know how to group together those species that are socially agreeable to one another; for trees, like human beings, have their likes and dislikes, and have been classed accordingly into those that are consociate and dissociate. Nor should the evergreen conifers ever be closely mingled in a plantation of this kind with broad-leaved deciduous trees. When such are combined they should be arranged in masses of like kind, each distinct. This separation is not so necessary with some of the broad-leaved evergreens that may succeed remarkably well as undergrowth beneath the partial shade of coppice wood; and in such situations they also produce a very pleasing effect, both in the summer and in the winter landscape.

While speaking of evergreens, especially the common pines, spruces, firs and junipers, this warning may be given: let the landscape-gardener beware of the rock upon which so many have made shipwreck, by planting too largely of this class, which will give a sombre appearance and a gloomy feeling to the whole outlook. In their proper place, and even in large masses, if relieved by groups of deciduous trees, or by masses of rocks, however, the evergreens are invaluable factors in landscape gardening. Their peculiar beauties are most highly appreciated in the dreary months of winter, and, when bedecked with snowy wreaths, they are often most wonderfully attractive.

When planted singly or in open groups, evergreens should be trained in such a manner as to preserve the lower branches. This may easily be accomplished in most species, for the first half-century of their existence, by an occasional shortening-in of the higher branches, which should not be allowed to extend beyond those below them. The aged, centenarian tree makes a noble object when rearing its broad, flat top on high, supported by a tall, clear bole; not so the younger sapling, the branches of which should nestle upon the ground, from whence its graceful and informally conical figure should rise clearly and distinctly. Such, however, is not the universal habit of all conifers; some of them are more massy and umbrageous, but in the case of the firs and spruces, the conical form is most natural, and may even become too formal unless they be judiciously managed and sparingly planted.

In the extensive forests of northern Europe, especially, the younger plantations of this class of trees are most weird-like and ghostly in their appearance. When partially concealed by dazzling snow wreaths, in the young forest plantations, they are indeed remarkable objects, but not adapted to ornament the quiet scenes of the landscape-garden.

FLOWER-BEDS AND SHRUBBERIES.

Flowers and flowering shrubs will claim the attention of the landscape-gardener, and the smaller the space he may have to ornament, the greater becomes their importance and use. Indeed, in large areas, and especially in the cemetery, their introduction should be restricted to the most narrow bounds, and confined to the immediate vicinity of the entrance. Their scattered use all over the ground must be considered in bad taste, and too often their shabby condition renders them obnoxious rather than otherwise. Wherever flower-beds are permitted, they should be artistically arranged, most judiciously selected and thoroughly tended by a professional florist. Their perfection is the requisite to their success, and this demands a perfect knowledge of the plants employed.

Thus you will see that the office is one of no limited acquirements. He who undertakes these tasks must be a man of extensive acquirements and broad views; he should be well educated in all that relates to *good taste*; he must be a practical engineer and architect; he should have a thorough knowledge of the botanical characters of plants and trees; he needs to be an artist, an architect, an engineer, a farmer, a forester and a florist, all in one.

With these views firmly impressed upon his mind you may now understand the feeling of hesitation and diffidence under which a compliance with the request of your Secretary has been undertaken by him who is forced to exclaim, "who is sufficient for these things?"

Pardon this extended exordium, my friends, and let us turn to the landscape which should characterize the modern rural cemetery. This is essentially an American idea, and it is most important that we should begin right, and so execute our plans as to keep within the pale of strict good taste. We have emerged from the barbarism and desolation of the forlorn burying grounds of the past, many of which—but for the neighboring church—were liable to be mistaken for the "potters' field, and intended only to bury strangers in." Therefore we must be the more careful to avoid the risks we incur of introducing barbaric splendor into these last resting places of the dead. The first attempts at improvement are to be encouraged, be they only the planting of common evergreen trees, in regular rows and squares, like an orchard. They show at least a desire for improvement, and in an old, long-used village burying ground this is often the utmost that can be accomplished.

The old church-yards of this country, as in Europe, once furnished the ground and the protection for burying the dead. With their limited areas a few generations only were required to fill them to repletion, and they were necessarily abandoned. These sacred spots are filled with associations of the past. In Europe especially they are famous for their ancient yews and box-trees, more venerable than any to be found in our new continent; but from them we may learn the value of these small evergreens, which are so eminently appropriate for the smaller lots in our cemeteries, where larger trees would be inadmissible. There are many other plants of small size that may be used. The grave-yards of southern Europe still present us with illustrations of the effects of the funeral cypress, so stiff and formal that they serve as exemplars to be avoided rather than patterns to be imitated in our rural cemeteries. And indeed we are in danger of committing a parallel blunder by seeking substitutes for the conventional cypress in the erect forms of yews and junipers, which are equally stiff and formal.

But in our growing country, with thriving villages and embryo cities springing up everywhere, many of them rapidly assuming metropolitan proportions, new grounds for interment are needed. These should be judiciously located,

carefully planned, and laid out in good taste. The field is open before us to mould it at our will. How important, then, that our work be well planned and judiciously executed.

Let us see to it, therefore, that we secure the best available talent in the landscape-gardeners we employ to plan and execute the future rural cemeteries of the land. As these grounds are intended to be the quiet resting places of our departed friends, the following desiderata should ever be kept prominently in the foreground of all our plans respecting their arrangement and management:

- (1.) There should be perfect security and permanence in the title, and against intrusion;
- (2.) Insuring peaceful quiet and perfect repose to all who may be brought within the sacred limits.
- (3.) The landscape should embrace a diversified surface of land and water.
- (4.) The area should be covered with green turf in broad stretches.
- (5.) Shaded by umbrageous trees, singly distributed at intervals, or in open groups;
- (6.) And reaching on either side to masses of foliage of differing hues, deciduous and evergreen, according to the situation. At the same time, from various commanding eminences, open and unobstructed vistas across the demesne and to distant objects of interest should be carefully preserved.
- (7.) Easy access to all parts of the ground should be provided by smooth, hard roads and paths, kept in perfect order.
- (8.) Of all things, we should enjoin severe simplicity and strictly good taste in the decorations of the graves, and in the mementos offered to the dear departed ones; no senseless gew-gaws, nor purse-proud memorials, nor gilded tombs; no transitory and fading floral offerings should here find place: much less appropriate are the flashy parterres of gaudy blooming and foliage plants, that are too often seen obtruding themselves upon the sacred limits of *God's Acre*. These tributes may have been bestowed by weeping and loving friends, whose tender sentiments are entitled to our sympathy and respect, but all these things are so perishable that they soon become an intrusion and decaying offense upon the quiet sanctity of the place.
- (9.) In the modern rural cemetery we want no selfish, repellant and obtrusive fences, as inclosures to our lots, ever decaying, and ever reminding us of the egotistic claims and pretensions of individuals, in this common meeting place of rich and poor, where all of us, from the highest to the lowest, are at last reduced to a common level, and to a condition in which there is and should be "no respect of persons."
- (10.) Lastly, and in immediate connection with the sentiments already presented, as appropriate accompaniments and conditions of the sacred precincts of the cemetery, let us carefully avoid another great danger incurred in our desire to pay due respect to the memories of our dead: let us avoid making such a sacred spot appear to be only one vast advertisement of the stone-cutter's thriving trade! * * * * Instead of this constant repetition of granite and marble, shaft and obelisk, of pretentious mausoleum or cenotaph, some persons will prefer to place a mass of native rock, partially faced for the inscription. Others again will prefer to mark the spot "most dear of all the earth beside" by planting a *memorial tree* to show the last resting place of their departed friends.

The selection of the species to be planted for this purpose will be governed very much by the size and situation of the lot, and also by the character of the soil. They should always be of a permanent or long-lived species. Where space permits they may be large and noble, such as the oaks or elms. The former will even be favorites for such planting. In low grounds and near water the willow (*S. babylonica*) has always been a favorite funereal tree, but though poetically affiliated with the tomb, few trees are more unsuitable than this foreigner from a milder climate, because this willow is short-lived and easily broken by storms. It is likely to be entirely supplanted by the Wisconsin weeper, which resists the northern winds. For smaller lots we have many trees or shrubs that may be used.

Without attempting to give you an extended catalogue of trees suitable for such planting, your attention is directed to the extremely formal character of some that should be avoided, because their free use becomes very tiresome. As an illustration you have been referred to the typical grave-yard tree, the funereal cypress, which you can only behold in pictures of burying places on the Mediterranean. But we are in danger still if we adopt the stiff, formal, and erect species of the junipers and yews, whose chief recommendation consists in the fact that they occupy little space; but neither do they fill the eye of taste. Many small and slow-growing kinds of evergreens are not open to this objection, notably the yews, the box, and still further south many broad-leaved evergreens.

You may think we demand too much for the modern cemetery. It is true that a previous generation might have been shocked by some of the propositions now presented, and some tender hearts of the present decade may possibly be startled, but we are progressing. Who now desires to be embalmed after death and stowed away, even in a pyramid of Titanic proportions on the banks of the Nile, or to be thrust alongside the dead of preceding generations into the catacombs of Rome or Paris, or even to be interred in the crowded church-yards beside the old cathedrals of Europe, much less beneath the tiling of their floors? Even the historic and almost sacred precincts of Westminster Abbey present few attractions as a burial place for us. With strong good sense the American people, in the light of sanitary science, have forbidden interments in such places, and indeed, within municipal corporations; the graveyard of the past century is no longer used. The *rural cemetery* is everywhere popular. Nor are the requisitions contained in the ten propositions here recited a mere fancy sketch; they are to a great extent a portrait of what already exist in our own land.

Thanks to the talent of the superintendent and to the good sense and liberality of a directory who sustain him, we have all this as a reality. Where, do you ask? At the city of Cincinnati, Ohio, which possesses the finest rural cemetery of this or any other land. That cemetery, my friends, which has become a model for very many others in various parts of our country, and which is highly complimented by visitors from abroad, is the legitimate outgrowth of a horticultural society.

Hoping that this digression from *pomology* will not be considered an intrusion upon the routine of your meeting, you are asked to accept my sincere thanks for your patient attention.

At the close of Dr. Warder's paper a communication was read from Dr. Frieze of the University, inviting the society to visit the various departments

of the University. The invitation was accepted and the afternoon of the same day was given for the visit.

The next paper of the morning was given by Mr. Robert T. McNaughton, taking for his subject—

THE VALUE AND CULTURE OF THE LESS COMMON VEGETABLES.

In these practical, matter-of-fact days, and at an occasion so limited for time as the present, there is little demand for anything which is not brief and to the point, and I shall be expected to enumerate concisely the facts as I find them concerning the value and culture of the less common vegetables, among which I include asparagus, cauliflower, celery, egg-plant, radish, salsify, spinach and sweet potato. Before speaking of the cultivation of these vegetables, we want to know why we cultivate them. Allow me then a very few preliminary words as to why I believe these vegetables are valuable:

1st. They are in themselves delicious if properly placed on the table, being among the luxuries, if not the necessities of life.

2nd. They are a variety and change from the more common sorts generally used, and hence desirable.

3d. They are of value from a dietary and medicinal view, by giving variety of nourishment, and perhaps by possessing peculiar medicinal properties. Celery, for example, is said to be a specific for nervousness, and the general tone of the system is better maintained by a variety of vegetable food than by pork and potatoes alone. Thus any acquisition of the kind is to be hailed as valuable.

4th. These vegetables are more valuable than common sorts if anything is to be sold from the garden. Being less common, they command a better price in the market.

I shall try to show that these vegetables are not more difficult to raise than most of the more common ones. If, then, they are so evidently valuable, and are easy of production, why are they "less common"?

In the first place, because they are rather delicacies than necessities, and the necessities are the first to be raised.

Again, because they are comparatively new and unfamiliar, and however desirable, all innovations are of somewhat slow growth. To make them more familiar to people is the object of this discussion.

And, finally, because people think, without knowing much about it, that it is difficult to grow them.

These are sufficient reasons why they are not more commonly grown; and now to answer the objection implied in the last remark, let me give the modes in which I should cultivate these vegetables.

ASPARAGUS.

Since an asparagus bed will last without renewal for a long time, it needs to be thoroughly made at the outset. The soil, which should be a rich, sandy loam, should be deeply and thoroughly plowed, turning in some well rotted manure. After this thorough pulverizing, the plants must be set out. If raised from seed, this must be sown the spring previous in rows, and kept clear from weeds, and in one year's time, if well grown, the plants will be fit to set out. Conover's Colossal is perhaps the best variety, and the plants should be set out rather early in the spring, nine inches apart in rows three feet apart, spreading out the roots naturally and setting the crown of the plant two or

three inches below the surface. Keep the bed well weeded and mellow and the plants will thrive. Cut the shoots when five or six inches long with a sloping cut, a little below the surface. Do not forget to make the bed *deep* and *rich*.

CAULIFLOWER.

Plants of this delicious vegetable should be set out the same time with early cabbage—about April 1st—and treated almost exactly like cabbage. It needs considerable moisture, and should be planted thus early to head out before hot weather. Early Erfurt is a good sort. In planting this and also cabbage, tomatoes, etc., a strip of paper may be wound around the stalk of the plants, extending a little below the ground, to prevent cut-worms attacking it.

CELERY.

The cultivation of celery is far more easy than many suppose. The seed should be sown early in April, in a rich bed, covering very lightly, or simply patting down with the spade. Keep the bed free from weeds, and as the plants grow, shear off the top leaves once or twice to make them grow stocky. Some time during July, on a moist day if possible, set out the plants on the level ground, or in a slight trench, six inches apart, in rows three feet apart. Firm the earth closely around the plants while setting. Keep the plants free from weeds, and allow them to grow till a month or two before it is wanted for use. Then, since celery must be blanched to make it edible, the earth must be drawn up close around the plants with the hands and then banked up with the spade to the top of the plant. This may be done about the 1st of September, if it is expected to use the celery along in the fall. If wanted for winter use, no banking up is necessary, but the earth should be drawn up around the plants to keep the leaves in an upright state. Then when dug up in November it may be taken into a cool cellar and packed, with the earth clinging to the roots, into a barrel or long box, which may be made with some rough boards for one side and the cellar wall for the other. Packed together closely in this way, it will be likely to keep fresh, and being dark, it will blanch by the time it is wanted for use. This is the best way I know of keeping it, all things considered. This plan of cultivation is certainly not so laborious but that any one may have the delicious vegetable. Celery needs a moist, cool atmosphere to do well, and I find that when planted along the north side of my rows of sweet corn it does better, being in the shade, than when in the hot sun. The soil should be rather moist, and the best variety is some dwarf kind, as Boston Market or Sandringham Dwarf. It will stand quite a sharp frost without injury, but like any other vegetable, must not be touched while frozen, as this will induce decay.

EGG PLANT.

This plant is very tender, and the seeds must be sown in a hot-bed about April 1st and planted out in the open ground about two months later, in a rich soil, two or three feet apart.

RADISH.

A light soil is necessary for the radish, and it is easily raised by sowing the seed broadcast over the ground and covering lightly with the rake. Early long scarlet short top is the best.

SALSIFY.

The salsify is a hardy plant and is grown in all respects like the carrot, sowing in rows far enough apart to cultivate, and thinning out to four or five inches between the plants. Sow most any time in the spring and keep clear of weeds from the start. It may be left out all winter, but is better to put into pits like parsnips.

SPINACH.

Concerning this vegetable Peter Henderson says: "I could never account for the fact that some vegetables always continue to be more profitable to raise than others that require the same expenditure of labor. Here we have a marked case in point. Spinach, which certainly requires no more labor in raising than a crop of potatoes, continues to give a profit of at least three times as much per acre on fields divided only by a post and rail fence. The men that grow the spinach are never foolish enough to encumber their ground with potatoes." Spinach should be sown in early spring and at intervals thereafter for succession, and about all that is required is to sow the seed and cut off the greens when large enough. As it is perfectly hardy it may also be sown just about the time for sowing wheat and left out all winter for early spring use, covering lightly with straw or marsh hay as winter approaches.

SWEET POTATO.

This is usually thought to be a vegetable requiring a very warm climate and not adapted to the north at all, but it may be grown here successfully if the soil is light and warm. The plants must be procured about the first of June and set in ridges made by plowing two furrows together about one foot apart, with the ridges three or four feet apart. They must be kept during the winter in dry sand in a warm, dry chamber.

And now having watched these vegetables from the seed to the mature state, and put them carefully away in cellar and pit, I have finished my part of the work and relinquish to fairer hands the task of placing them before us on the table, where we will hope they may often be found, no longer deserving the name of "less common vegetables."

J. N. Stearns, Kalamazoo.—Celery in Kalamazoo would be hardly ranked as a "less common vegetable;" large quantities are grown to supply our own market and to ship to neighboring towns. Our people have learned to grow it well, and at ordinary prices it is made a very remunerative crop.

Wm. Saunders, Ontario.—Asparagus is one of the most delicate and satisfactory vegetables grown, and I regret that it must be classed as a less common one. I sometimes question whether the elaborate plan of preparing for and growing this vegetable, as recommended by so many, is not responsible for the lack of it upon so many tables. I should take issue with the author of the excellent paper, upon this point. It seems to me there is really no necessity for the expense he recommends in connection with the preparation of an asparagus bed. My experience leads me to advise, if one has ordinary good corn land, a very cheap way of raising this vegetable. I would invest in a few cents' worth of seed and sow it, with the opening of settled spring weather, in a good rich border. It takes but little space to raise a great number of plants. At one year old these plants are strong and vigorous, and can be transplanted in their permanent quarters. As I said before, good corn land is suitable for the bed; it should be plowed and well fitted and each autumn

should receive a liberal dressing of manure. Salt or brine thrown upon the surface in winter or spring, helps keep the weeds down, and is a good fertilizer for the crop. No one need be without an asparagus bed that has a garden spot, and certainly no farmer can afford to deprive his table of this excellent garden vegetable.

J. S. Woodward, Lockport, N. Y.—Celery is a healthy vegetable—standing next to fruits in its value as a promoter of good health; and as a part of a good living it can not well be spared. Nervous people should never be without it. I have found a very excellent plan of managing it. When a man raises but little he generally has a great time hilling it up—trying to hold the stalks together with one hand, while he hauls the earth around with the other. It puts a man in a most uncomfortable position to say the least. My plan is to place a little roll of tin (stiff pasteboard will do) about the plant when it is small; the earth can be drawn up then, with no danger of throwing it into the heart of the plant. As it grows, the tin can be raised and more earth drawn up. Sometimes celery tends to throw out a good many lateral sprouts. These should be removed as it is banked up, thus throwing the growth into the main stalks. I always store my celery in winter in my cellar, placed in ordinary shoe boxes, putting a little earth in the bottom which can be kept moist. The depth of the box is about the height of the plants, and when they are used the blanching is complete to the very tips.

J. Lannin, South Haven.—Can celery be successfully grown upon sandy soil?

F. Waltz, of Detroit, gave his experience in raising celery for the Detroit market. For the early sales he raised his plants in the hot-bed; but for the main crop sowed the seed in the open border. He thought it very important that the seed be pressed into the ground; this he accomplished by pressing heavily upon a board laid over the seed. The first celery goes into market early in July. For the late crop he used the ground planted to early cabbages, the rows of which he places four and one-half feet apart. He considered the celery grown upon heavy soil sweeter and of more delicious flavor than that grown upon sandy soil.

Dr. Lockwood, Ann Arbor.—Is not the dwarf variety considered of better flavor than the stronger growing sorts?

Mr. Waltz.—Yes, I consider the dwarf kinds best.

J. N. Stearns.—In answer to Mr. Lannin's query, I will say that in my observation and experience celery grown upon sandy soil is better than that grown upon a vegetable deposit. To be sure, it costs more to raise it on the dryer sandy soil, but when you get it the quality is superior; I grow Turner's Incomparable.

The last paper of the morning was given by Prof. A. J. Cook, of the Agricultural College at Lansing, on the subject of

NEW INSECT ENEMIES AND NEW METHODS OF INSECT WARFARE.

By new insect enemies I do not refer to species newly evolved, for though we believe that species have been and are being evolved, still the process is too slow to readily admit of direct demonstration. Neither do I refer to newly discovered insects, for all those of which I speak are long and well known to entomologists. Nor yet do I refer to insects with newly evolved habits, so that now for the first time they are known as noxious species, for all have previously won a bad record, though two of the species are not generally known, nor have

their mischief-making tendencies been generally recorded. But I rather aim to call to your attention and to place on record the characters and habits of certain species either new to Michigan or whose noxious habits have not as yet found space in our excellent reports.

GRAPE VINE FLEA-BEETLE—*Haltica chalybea* illeger. Family *Chrysomelidæ*.
Order *Coleoptera*.

This little coleopterous pest is no new enemy to the grape vine. Even Harris, in his *Injurious Insects*, describes this little beetle. Nor has it just commenced its depredations in our own State. Four years ago, our prince in Michigan grape culture, whose knowledge, experience, and enthusiasm have been so valuable to this society—need I say Mr. E. Bradfield?—sent me these beetles, in the larva state, with a loud cry of alarm for his favorite fruit. Since then I have seen the blighting ravages of this little pest in several vineyards about Lansing, and have heard of the same in various sections of the State. No Michigan grape grower can afford to be ignorant of this beetle, which, though small in size, is not small in its power for mischief.

This beetle (Fig. 1, *d*) is, like all of the leaf-eating family—*Chrysomelidæ*—oblong, oval in form. It is, as the specific name indicates, blue in color. Its length is about four *m. m.*, or less than three-sixteenths of an inch. Like all of its genus, its posterior legs are enlarged, fitting it for jumping, hence the generic name *Haltica*. This jumping peculiarity is obvious if we attempt to catch the little pests, for like the Dutchman's flea, when we put our finger on them they are not there. All present are doubtless familiar with the like habits of the striped, and cucumber flea-beetles, *H. striolata* and *H. cucumeris*, so common about radishes, and our various cucurbitaceous plants in summer.

The grub or larva (Fig. 1, *b*) of the grape vine flea-beetle is brown above, but lighter beneath, with a shining black head. It is six *m. m.*, or 0.35 of an inch long. The thoracic legs are black, the anal orange. Along the back are rows of black spots, each giving rise to a hair.

The habits of these pests will be more interesting to practical pomologists, and so I will proceed to detail them. The beetles come forth from the ground in mid-summer, but do no special harm till they come forth from their hibernation, the following spring, when they attack the opening buds, in the month of May, and thus at the same time blast the vines and the hopes of the vineyardist. They often at this stage do irreparable



FIG. 1.—GRAPE VINE FLEA BEETLE.

a. Leaf attacked by grubs. *b.* Larva magnified.
c. Egg magnified. *d.* Beetle magnified.

damage. But not content with this, they pair and scatter their yellow egg clusters (Fig. 1, *c*, egg magnified) about the leaves of the vines. From these eggs come forth the brown grubs (Fig. 1, *a*), which often strip the vines of their

foliage. It is at this stage that they have most alarmed Mr. Bradfield. After feeding for from three to five weeks they descend to the earth and pupate. Thus like the Colorado potato beetle, and most other chrysomelids, they feed on the same plant in both the larva and imago state. I presume that the larvæ will succumb to the pyrethrum remedy to be described, but it is stated that simply scattering lime on the leaves will destroy them. I think that the beetles might be killed by use of London purple or Paris green, but an easy remedy is described by our national entomologist, Prof. J. H. Comstock. It is similar to that used in jarring for cureulios, except that the sheet is wet with kerosene oil. As the vines are jarred, the beetles spring onto the sheet and are immediately killed by the kerosene.

THE SNOWY CRICKET—*Ecanthus nivius*, Harr. Family *Gryllidæ*. Order *Orthoptera*.

These beautiful white crickets are common throughout our State. I frequently capture them while collecting insects from about foliage, and often take them while "sugaring" for moths in August and September. A taste similar to that which attracts these graceful crickets to the sugar traps also causes them to cut off immature grapes. But the worst injury wrought by these snowy crickets is that done to various trees and shrubs, notably the canes of blackberries and raspberries, and the twigs of peach trees, in the work of egg-laying. In our own State, especially in the western part, this mischief is quite serious. Each spring I receive numerous specimens of these scarred and disfigured twigs, with inquiry as



FIG. 2.—SNOWY CRICKET, SIDE VIEW. to the cause of the damage.

This cricket (Figs 2 and 3) is greenish white in color. It is a little less than two *c. m.*—about $\frac{5}{8}$ of an inch—in length. The small yellow elongated eggs are placed in the twig in a compact



FIG. 3.—SNOWY CRICKET, DORSAL SURFACE.

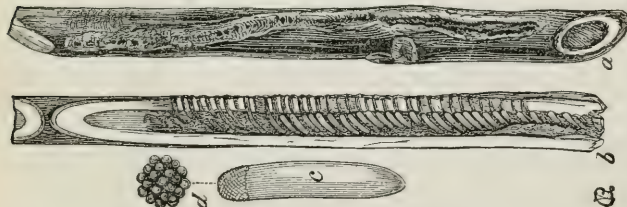


FIG. 4.—EGGS OF SNOWY CRICKET.

a. Affected twig. *b.* Twig cut longitudinal. *c.* Single egg magnified.

on the plants. The only method to successfully fight these awkward pruners that I can suggest is to cut and burn the affected twigs in winter and early spring.

During the past summer my attention has been called to two new pests in our State, the parsnip-seed moth, *Depressaria heracliana*, the larva of which attacks and destroys the immature seed of the parsnip. It spins a web as it works. It commits its depredations in the month of July. During the past season it has wrought ruin among the gardens of Howell. As this insect will be fully described and illustrated in the next report of the State Board of Agriculture, I will only remark here that London purple, Paris green or pyrethrum will surely exterminate the pest, and at a light expense. The other enemy I will call the strawberry-leaf beetle. It is *Paria aterrima*, Oliv. This little beetle entirely defoliates the strawberry plants in early spring, and works on

them again in autumn. This insect will also be fully described in our next agricultural report. The same remedies that I have recommended for the parsnip-seed larva will also avail here. If the poisons are used, they should be applied early, before the vines commence fruiting; of course, the earlier the better.

In reference to new methods of fighting injurious insects, the following from a paper which I read at the last meeting of the Association for the Advancement of Science will be of practical interest to horticulturists, and may well find a place in our reports, especially as the first experiments detailed were made because of suggestions offered at the last February meeting of this society: It is well known that there is no worse pest to the pomologist than the codling moth. (*Carpocapsa pomonella*, Linn.) The great mischief done by this pest is augmented, from the fact that the best preventive hitherto known has been effective only after the insect had done its evil work. We have known no way to destroy the larvæ until after the apples were eaten. Last winter I learned from Mr. J. S. Woodward, of Lockport, N. Y., that trees thoroughly syringed with Paris green, about the 20th of May, bore apples which were wholly exempt from the ravages of the apple-worm. Acting upon this suggestion, I thoroughly sprayed some Siberian crab-apple trees the 25th of May, and again the 20th of June; but I used London purple, one table-spoonful to two gallons of water. The fruit of these trees has been seriously injured whenever they have borne during previous years. This year they were loaded with fruit, but careful examination, made August 19th, discovered not a single injured apple. A few showed signs of the previous work of the larvæ, but as no burrow extended more than one-fourth of an inch, no harm was done. Other apple trees, only a few rods distant, which were not treated with the poisonous liquid, are bearing fruit, one-fourth to one-half of which is "wormy."

From the very small amount of the poison applied to each tree, not more than one-third of an ounce, the cost of the remedy is light. For the same reason, as also the early application of the poison when the fruit is yet immature, and is sure to be washed by frequent rains before it is gathered, we should expect no danger from the use of London purple. But to make assurance doubly sure, I cut from a portion of the apples, on a part of a tree where the poison was applied in such excess as to destroy the foliage, one hundred of the blossoms, the portion where the poison would be sure to lodge, and submitted them to Dr. Kedzie for analysis. Not a trace of the poison was found. If future experience sustains the conclusions as to the efficiency of this remedy, it will be a very important discovery.

Previous to the present time, there has been no satisfactory method known of fighting such pests as the cabbage maggot (*Anthomyia brassicæ*, Bouché) and other insects of the same genus, and the squash borer (*Melittia cucurbitæ*, Harr.). The late Dr. Walsh recommended hot water, but this has proved only partially successful. During the present season my pupil, Mr. Charles McKenny, and myself have tried bisulphide of carbon with the happiest results. I was led to try this from its excellence in destroying museum pests, and the success which has attended its use in Europe in destroying the grape *Phylloxera*. To apply it a small hole is made in the earth near the main root of the plant, by use of a walking-stick or other rod, and about one-half a teaspoonful of the liquid poured in, when the hole is quickly filled with earth and pressed down by the foot. In every case the insects were killed without injury to the plants. I believe this substance promises most satisfactory results in fighting the above-mentioned insects, the peach-borers and other insects

that attack the roots of our cultivated plants. We must remember that this liquid is very volatile, and the vapor very explosive.

PYRETHRUM.

This substance has long been in the market under the name of Persian and Dalmatian insect powder, and sold as a destroyer of house flies, cockroaches, etc. But owing doubtless to the fact that the effective element is a volatile oil, the foreign substance often failed to destroy, as it did in my hands. The essential element had escaped.

In 1879 Mr. Wm. Saunders of Ontario experimented with the Persian insect powder, the pulverized flowers of *Pyrethrum carneum*, and *P. roseum*, and the Dalmatian, the powdered flowers of *P. cinerariaefolium*. He found the latter the most efficient. It only kills by coming in contact, and seems to paralyze the insect at first and finally kills outright. Mr. Saunders experimented with house flies, blue bottle flies, grasshoppers, plant lice, etc. He found that all fell upon their backs in from two minutes to six or eight minutes. The insects remain paralyzed sometimes for two or three days before they die, and a few were seen to recover so far as to walk or fly away.

Prof. C. V. Riley has attacked this problem with the characteristic energy with which he grapples any insect question. His experiments show that this substance is equally effective against nearly if not quite all our insect foes. Prof. Riley commenced his investigations in 1878, and has continued them to the present time. During the past season he has pushed his investigations with extraordinary vigor. He has found that mixing the pyrethrum with flour in the proportion of one of the pyrethrum to twenty parts of flour in no way injures the value of the application. And that when mixed with water, at the rate of one tablespoonful to one gallon of water, or even two gallons of water, it still is potent to destroy.

The great argument in favor of pyrethrum is its harmless nature as effecting man and other animals of the mammalian branch. When breathed it is no more disagreeable than any vegetable dust, and I fed it to a neighbor's dog and regret to state that the dog is still alive and can bark at all hours.

Heretofore the cost of pyrethrum has been a bar to its general use. It has been sold at \$1.25 per lb. But Mr. Milco of Stockton, California, who has for the last few years grown this plant very successfully, has informed Prof. Riley that he has grown 147 lbs. to the acre, and that the whole expense of putting it on to the market need not exceed six or seven cents. When its culture becomes common, then, we may expect that the price will not exceed that of London purple. Mr. Milco grows the *P. cinerariaefolium*, and so manufactures the Dalmatian powder under the name of "Buhach." It is probably true that this plant can be grown in the southern States, and very probably in all sections of the United States; if so we may expect very soon to find it in the market at rates within the reach of all.

During the past season I have tried this pyrethrum ("Buhach"), which I received through the kindness of Prof. Riley, on the larvæ and imagoes of the potato beetle, *Doryphora lo-lineata* on the cabbage caterpillar, *Pieris rapæ* on squash bugs, *Coreus tristis* on plant lice, on house flies, and on mosquitoes, and found it speedy death to all except the squash bugs, which even lived in the powder for three days before dying. I also found that one tablespoonful of the powder to forty of flour was effective in killing the cabbage caterpillar, and that the same amount of powder to two gallons of water was even better,

owing doubtless to its more thorough application. The result seems to depend more on actual contact than upon amount of the powder. As I have sent to Prof. Riley the full details of my extensive experiments for publication I will not repeat them here.

The significance of these facts is fairly startling. We have a cheap, non-poisonous insecticide, by use of which noxious caterpillars are brought low, beetles and their grubs exterminated, flies and their maggots put *hors du combat*, plant lice overcome, parasitic lice—of course I mean those affecting sheep, cattle, fowls, and other of our domestic animals—exterminated, house flies and mosquitoes sent where mankind has long wished them, and were I in Kansas I would add the bed-bug, that cruel old *Cimex lectularius* is no more.

To apply this substance to insects which destroy vegetation, we can best mix with water and apply with a fountain pump. To kill house flies we have only to throw the dust about the room by use of a bellows. To destroy vermin on our domestic animals we can wash them with the liquid mixture, or dust it well through their hair, wool and feathers, and as in case of close rooms like poultry houses, fill the room with the dust.

Mr. Collar, Adrian.—Will pyrethrum powder effect curculio?

Prof. Cook.—I have no doubt but it will, but for this purpose at present prices it would be an expensive remedy.

Dr. Lockwood.—Where can we obtain this powder?

Prof. Cook.—I cannot tell you where you can surely obtain a pure article at present, but I doubt not very soon it will be in the markets.

Mr. Saunders.—I have no doubt but the pyrethrum may be grown successfully in our own country, but not at six or seven cents per pound, as suggested in the paper. In Dalmatia, where the kind of labor required in its production is exceedingly cheap, they cannot produce it in the largest quantities at that figure. We may expect to pay, I think, seventy-five cents or one dollar per pound at retail, and then be satisfied. For although I have not reached as satisfactory results in my experiments as Prof. Cook, still I believe it promises to be the best insecticide I know, always taking into consideration the safety in employing it. *Cinerariaefolium* is more effective than either *roseum* or *carneum*. Mr. Saunders spoke in some detail concerning the production of London purple (a full account of which is given in the Secretary's portfolio), and said we could not impress too strongly the necessity of caution in using these poisonous compounds.

W. W. Tracy, Detroit.—I bought pyrethrum powder at three different drug houses, and two out of the three times succeeded in getting effective powder; so I think we can even now run a pretty good chance of getting the pure article.

W. C. Latta.—In using the powder on cabbages, to drive away the worms, we did not succeed wholly; there were some worms left.

Prof. Cook.—Yes, this will be the case, but the cabbage is a bad thing to permeate with the powder. Still we had on the whole very excellent success; but very few of the worms remaining.

Tuesday Afternoon.

At 2 o'clock the delegates in attendance met at the University main building, and after shaking hands with Dr. Frieze and a number of his associates from the Faculty, proceeded through the various buildings, enjoying a rich treat under the guidance of Dr. Frieze.

Soon after 4 o'clock President Lyon called the meeting to order again in the court-house, and the question,

SHALL TREE AGENTS BE ENCOURAGED?

was called up. A short paper from the pen of E. M. Potter, of Kalamazoo, was read by the Secretary to open the discussion, the full text of which is here given :

MR. PRESIDENT, LADIES AND GENTLEMEN :—I am fully aware that this is a very delicate subject for discussion, and one that calls in question the occupation of a very sensitive class of individuals. I am also of the opinion that if this question was submitted to the community at large, the negative response would be as overwhelming as the "Garfield" vote.

In the fore part of June, 1858, there sat in an office of one of the eastern nurseries, a young man, brought up on a farm, receiving his outfit and instructions previous to his first attempt at canvassing.

In answer to his inquiry as to where he had better go, the senior partner of the firm told him to select his own territory. In answer to his question, "How had I better approach a man so as to secure his order," the junior partner of the concern told him to provide himself with "a box of tobacco as big as his two hands, and on the first approach to a stranger who looked as if he used the weed, offer it to him." This last piece of advice, I am happy to say, he never followed; but in accordance with the senior's instruction, this unsophisticated young man procured a pocket map of Pennsylvania. He had heard of the great thrift of the farmers and their huge barns in the Keystone State, and he had very naturally concluded that any one possessed of even a few acres, and making any pretensions to thrift, would not rest satisfied until his home was amply supplied with all the leading varieties of fruit suited to the climate, and I may say that I have good reason for believing that "he is of the same opinion still." A few hours later and this young man was hurried down through the Genesee and Cohocton valleys at railroad speed, and after a couple of changes he arrived at a small village near the banks of the Susquehanna. Being weighed down with a realizing sense of great responsibility, rendered doubly so by a sanguine feeling of wonderful success, the "sombre shades of night" gave but little rest to our "newly-fledged" tree-agent. Little did the good people of that community dream of the "golden opportunity" soon to present itself, or the sure road to wealth which would come close to their doors if they would only "take stock" in the enterprise. The morrow dawned, and after breakfast our young man, with all the encouragement which could be heaped upon him by a worthy landlord, whose hospitality could only be measured by the contents of his guest's pocket-book, started out. This young man, who had but just left his rural home, with the blessing of a Christian father, and followed by the prayers of a devoted mother; this young man, who had been brought up never to tell a falsehood or steal a lump out of the sugar-bowl; this young man, who, if I do say it, was honest, and had entered conscientiously upon this new and, as he supposed, perfectly honorable occupation—approached the residence of what appeared to be the home of a well-to-do farmer; and what kind of a reception do you think he got? It was something like this:

"Vell! now, young man! I vants none of your humbugs at all. Shust a few years ago some Yankee fellers, he cums round drafting, and I lets 'em draft my orchard, and dey shust cuts dem sticks rightut off one tree and puts

dem in de next, and de apples ain't half so good as dey was before. No! sir-e-e! You better shust git right along."

And if you had met that young man on his way to the next house, and had asked him if "tree-agents ought to be encouraged," he would have said without any hesitation or mental reservation, "Yes, indeed! they need encouragement by all means." And I say if ever there was a poor, humiliated boy, who had grown up conscious of trying to do well, and yet, right here at the outset, branded as a dishonest scoundrel, who needed encouragement, it was this one. So the day passed, and at night he returned to his hotel, weary and crest-fallen with that "grafting story," which he had heard reiterated from so many different lips, still ringing in his ears. After about a week of similar experience in that vicinity and the adjoining towns, he came in one evening to find an acquaintance, representing another nursery not far from his own, who, by a strange coincidence, had selected this same field for operations. But little, if anything, was said of the events of the past week, and after another night of "troubled sleep," these two "new-born" tree-agents started out in different directions. After unsuccessful tramping for two or three days, our "hero" returned to his headquarters to find that his "partner in distress" had tried it only one day, paid his bill, left most of his outfit, and had completely and forever "shaken off the dust," as a testimony against that community for their treatment of tree-agents. The next heard of him was that he had shipped for a five-years' cruise on board of a whaler. Suffice it to say that the subject of our sketch, which is a true one, left soon after for the western part of the State, where he effected a good sale, although he found that the "grafting story" was there sometime in advance; and I am almost certain that the inhabitants of Indiana and Clearfield counties in Pennsylvania are to-day enjoying the benefits of good fruit, which they never would have tasted if it had not been for the personal and persistent appeals of that tree-agent. The facts are, that a very large percentage of our population do not realize how necessary good fruit is to health; but rather consider it as a sort of luxury which they can possibly do without. If I were a physician, and desired to do the world a lasting and valuable service, I would give them this free prescription: "Eat less pork and more fruit!"

Even those who can afford good trees and really want them, are poorly informed as to the kinds most desirable and where to obtain them. Every man who controls even a "garden patch" should possess and read his county paper, the leading horticultural paper of his State, and the reports of the "State Horticultural Society." These all are good, paying investments for everybody. How often have we found a single number of a good paper worth more to us than the subscription price for a year. People say, "there are so many humbugs that they are afraid to buy anything;" and all we can say to such is, that the best way to avoid imposition is to lay in a good stock of information, and exercise that heaven-born gift of common sense. Some people will never profit by the experience of others, but always want to see the folly of it themselves. To those we would say that the quicker they get the experience, whether good or bad, the sooner they will be in a fair way to prosper. As I have before remarked, there are many, very many, who would never plant a tree if it were not for the personal solicitation of the tree-agent; and the almost prevailing custom at the present day of calling them all dishonest, or at least insinuating that they are so, makes it very difficult to obtain the best class of canvassers. If there is any business in the world that ought to employ the very best men, both as to qualification and character, it is the business

of propagating and disseminating nursery stock; and it does no one, or the business, any good by intimating to a stranger, whom we have never seen or heard of before, that he is a rascal and engaged in a bad occupation. If we are positive that we do not need his goods, or are embarrassed by other matters and cannot afford to invest just then, it is a very easy matter to pleasantly tell him so. But you say, shall we entrust the selection of trees and the chances for good fruit, after years of toil and patient waiting, to one whom we know nothing of? I say by no means, but when a canvasser approaches you, treat him at least with civility, or as you would like to be treated. Supposing an honest, upright farmer should go to the city to contract his pork in advance of delivery, and when offering it for sale, was sarcastically told that "a great many hogs are sick and dying, and that they did not want any of that kind of pork." After he had heard that "year in and year out," I would not blame him if he had a desire to quit the business. Yes! I say, treat the canvasser at least with civility, and if you have time, hear him "say his piece," and, if he tells you anything that you know is impossible or even unreasonable, when he gets through politely ask him if he ever read of the fate of Ananias and Sapphira. But if one comes to you representing a good establishment, which has a good reputation for fair dealing, and produces a duly authenticated certificate of agency, he is entitled to your confidence. But you say, "How do we know anything about the standing of the concern he represents?" If he gives good reference, it is very easy to ascertain; and, further, if they advertise in a reliable paper, it is pretty good evidence, for I presume to say that none of our leading publications would advertise for a firm unless they believed them to be honest; on the contrary, their exposures of fraudulent dealings are of immense value to their subscribers, and even casual readers.

But you say, perhaps the firm is all right, but possibly the certificate of agency is a "fraud." It is a very easy matter for one to take down the agent's name and date of the certificate, and at any time before the delivery to write to headquarters and ascertain if the credentials are all right, and if not, to countermand the order, if already given. You are well aware, I presume, that a misrepresentation of any kind, by either party in a deal, makes that party criminally liable, or least renders the trade null and void. The facts are, that it seems as if a certain class of people "liked to be humbugged," and can never learn anything only by a costly experience. If this is a fact, we may justly conclude that even dishonest tree-agents are doing them a good service, and ought to be "encouraged" in their special mission. I knew an honest canvasser once, who, after hearing a man tell how many times he had been "humbugged," replied by saying, "Well, sir, if you have been 'humbugged' as many times as that, it will not hurt you any now, and I'll agree not to humbug you any worse than the rest of them." He got his order twice, and gave him "full value received" both times.

As I said before, very few trees would be planted if it were not for the personal solicitation of the canvasser, except by those who make fruit-growing a speciality.

It is a sad fact, that many of those who need and want trees, even if they knew just what they wanted and where to send for them, could not make out an order correctly, and the chances for mistakes and dissatisfaction would be great even in that case; and if they could make out the order correctly, would defer it year after year, and thus cheat themselves and their posterity out of any fruit at all. Most of the commodities that we use at the present day are sold either to the retailer or the consumer by traveling agents, and yet I will

admit that deception, or even mistakes in the tree business, may not be detected until after a lapse of years. The only way I know of is for all parties engaged in either branch of this business to use every precaution to have everything reliable; and I know of no better method than for the nurseryman who is trying to build up a good business to require of each agent a good bond for the faithful performance of duty to customer as well as employer, and then provide the agent with a certificate and other necessary credentials, according to the territory to be canvassed. I am of the opinion that if good canvassers thus equipped were uniformly treated courteously, the occupation would be sought after by a better class of persons than at present.

H. W. Doney, Jackson.—I believe that I am not so prejudiced that I cannot appreciate every word of the paper; still the question under discussion, if put to me, would be answered No! and very little qualification. I do not condemn all of the agents, but the most of them will lie, steal and draw their nets about honest men, in a way that deserves the severest condemnation. My own experience has been a bitter one. I have grown trees in Jackson county over forty years, and have grafted a good deal about the county, and there is not a school district but has suffered from the raids of these unprincipled villains. Mr. Doney gave a lengthy account of the way in which, on several occasions, he had been deceived by agents, and enlarged upon the long-continued effects of this kind of rascality. He closed by advising that men should deal directly with well-established nurseries, or only with agents that could prove themselves authorized by such establishments to take orders.

J. Lannin.—I believe that many a farm is improved through the adding of an orchard, the direct result of the persistence of the fruit-tree agents. It was my own case in Canada. I have not always got what I ordered, but the average has been good. The fault at least should be divided between the agents and the purchasers. A man should know first what he wants, and then should have sufficient keenness to detect in agents at least the worst forms of villainy. It seems to me that by the use of discretion a man will do about as well to deal with agents as the nursery itself. He is not obliged to buy of any man until he knows what and whom he represents.

H. E. Hooker, Rochester, N. Y.—This topic has to take a prominent place in the discussions of fruit-growers, because of the rascality which, as has been said, is practiced in every State, and perhaps every county. But with all the evil, has come a great deal of good. We want to eliminate the evil, and must do it through the dissemination of intelligence in horticultural matters from our organizations; in the same manner that the University here is educating the people by sending out men all over the world that have been started within its walls. I have seen for some years that nurserymen are very largely in blame for the frauds practiced in tree selling. If nurserymen would not sell trees to men that they believed were unscrupulous, the evil would be decimated. I know of dealers who go to nurseries and buy trees, making their own labels and placing them to suit the orders, regardless of the varieties they purchase. *A nurseryman is not honest who will allow this upon his premises.* I am a nurseryman, and say we should not allow this practice, but rather should see that the trees leave the nursery correctly labeled. I can see even now, with all the frauds, that the good outbalances the evil; but we should seek to lessen the evil. Nurserymen can do a great deal in this direction. For four years I have been particular to let dealers understand this, and have lost many sales by it, but shall continue my method, and believe it will pay me to do so. I am satisfied that there are many honorable men, who are dealers in nursery stock,

that grow very little themselves, but buy largely to sell again, and are especially careful of their reputation.

J. S. Woodward, Lockport.—Mr. Hooker will bear me out in the remark that I have many times spoken very strongly upon this topic in our councils of fruit-growers, and have said some harsh things concerning tree dealers, peddlers and agents; still, I believe they are not an unmitigated evil. It is through the persistent endeavors of these fellows that we have so many door yards filled with rare trees in this country, in place of store-houses, pig-pens and a cluster of farm implements and rubbish; it is through their business enterprise that a great many farms have any fruit trees at all. The reason for so much swindling in this business is because there is such a good field for it in the ignorance of the people—willful ignorance; and I don't know but it "serves 'em right." A man who will never give a dollar for an agricultural paper, or any assistance to a horticultural society, and will let an agent take him in to the tune of ten, twenty, fifty or a hundred dollars, with a lot of refuse nursery stock, ought to be swindled into the use of good, common sense.

S. L. Fuller, Grand Rapids.—I wish to offer, in closing this discussion, the following resolution:

Resolved, That we recommend to purchasers the plan of buying nursery stock of nurserymen direct when they can; otherwise of agents who can establish their responsibility beyond a doubt; and to have no business transaction with tree agents or peddlers who have no authority from a known, responsible firm.

Adopted.

SUGGESTION FOR FUTURE MEETINGS.

Mr. Fuller said he liked the plan of employing every available moment of time at these meetings, and did not like the idea of spending so much time at the noon recess. At a meeting in Grand Rapids some years ago, the guests, instead of going to dinner, were invited to take lunch at the place of holding the meeting. This had very many things in its favor. First, it took less time, and the intermission could be shortened; second, it gave opportunity for social converse for which there was no other provision in the programme; third, as most of the delegates were provided for by town people, it gave an opportunity for others out in the country to assist in the entertainment, by bringing in the lunch; and again, it gave the ladies who kindly opened their houses to the delegates, an opportunity to attend the meetings without having to break away, perhaps when they were most interested, to go home and look after the dinner.

Mr. Fuller was supported by others in this plan, and at the close of the discussion the following resolution was unanimously adopted:

Resolved, That in accepting any invitation to hold future meetings of this society, the secretary is instructed to seek to make an arrangement by which the noon intermissions shall be occupied in social converse, over a lunch eaten in or near the hall of session.

On motion the convention took a recess until evening.

Tuesday Evening Session.

The usual excellent music opened the evening meeting, following which the president announced the committees for the meeting:

On Fruits for Premium.—G. H. LaFleur, Allegan; C. A. Sessions, Oceana county; Joseph Lannin, South Haven.

On Other Fruits.—Geo. W. Lawton, Lawton; H. C. Sherwood, Watervliet; Emmons Buell, Kalamazoo.

On Plants, Flowers, etc.—Wm. Saunders, Ontario; W. J. Beal, Lansing; A. C. Glidden, Paw Paw; Mrs. P. Collar, Adrian.

On Resolutions.—E. W. Cottrell, Detroit; S. B. Mann, Adrian; W. W. Tracy, Detroit.

The first address of the evening was by Mr. W. W. Tracy, of Detroit, on

DIFFICULTY OF MAINTAINING PURE AND GOOD SEEDS.

It may seem an unwarranted waste of the time of an audience like this to attempt to define a seed, but I think I can better present some of the difficulties in the way of maintaining good seeds if I first say a few words concerning what I conceive a seed to be. If you had visited me in Detroit last summer, and been charmed by some variegated-leaved shrub, I might have promised to send you a plant, and in fulfilling the promise this fall I had carefully packed a plant, my little boy, who sometimes asks questions, might have done so in this way: "Why, papa, what made you wait so long before sending the plant to Mr. Smith? It was the leaves he liked, and now they are all gone he won't care for it; besides, you have cut off most all the branches, and what makes you pack up the roots so carefully and leave the top all open." It would take but a few words to explain to him that the leaves while active kept up an incessant demand for water and food, which must mainly be collected by the roots from the ground, a work they could not do if separated from it; that the leaves, although essential to growth, were not essential to mere existence; that wrapt up in the buds were tiny new leaves ready to take the place of the old. So I waited until now and cut off most of the stem to make it easier to send the plant. Again, the roots even in a comparatively dormant condition could not endure the changes of temperature and moisture that would be harmless to the rest of the plant, so I must take pains to carefully protect them, but may leave the branches exposed. In something of the way my boy would then look at the package I had made, I look at a seed, simply as a plant packed for transportation. I waited until the leaves were reduced to a minimum; the seed contains only the two embryo leaves; I cut off all but a small portion of the stem; in the seed the stem is a mere rudiment. I, of necessity, cut off the greater portion of the roots, and those that I saved gave me by far more trouble to pack than did the rest of the plant. The Creator cuts off the root entirely and supplies its place by a quantity of food stored in or around the plant to sustain it until it can form fresh roots in its new home. I wrap my plant in soft moss and then pack in some firmer material to prevent injury while in transit. The seed has a soft and pliant inner coat and a hard and firm exterior casing to protect it. Beyond the fact that the seed plant is packed by Divine hands, with infinite wisdom and skill, while mine is more clumsy human work, I can see but little difference between my awkward package and the beautiful seed. One is as capable of development under, and its future life depends as much upon favorable circumstances as the other. Each is equally separated from the plant that produced it; the future life of each must be the development, under favorable or unfavorable circumstances, of its inherent nature. The seed is as entirely and completely a distinct and self-contained individual, with all its characteristics and limitations fixed and immutable, as is the babe when placed in its father's arms. You admit this here, but practically you, and the great mass of people beyond you, do not believe it. To most people the seed is mere inert matter, which it is essential, it is true, to add to the soil in order to produce a crop, but which has nothing of the living

force, the individual character with the power of transmitting it, that makes the blooded stock in their stables so valuable. Men laugh at the idea of pedigree seed. An agricultural paper of national reputation, which gives column after column to the record and discussion of the pedigrees of stock, met with a column of editorial ridicule at the idea of pedigree seed when presented by an eastern writer. And when one of the professors in our agricultural college presented the subject and spoke of some of the ways in which seeds could be improved by breeding, a local but influential paper, that boasts of its scientific and practical ability, saw fit to remark that if the professors of the college could not find anything of more practical importance to the farmers of the State than breeding seed, they had better give place to some one that could. And it doubtless expressed the opinion of thousands of well-informed people who have given the subject but little thought. Let us look at the case a moment. We value our blooded stock not because they are individually worth so much more for meat, but because of the improvement we expect to find in their descendants, as so well is this recognized that if some patron of agriculture should bring into the State a bull whose descendants might be expected to be 20 per cent more valuable for beef than the common stock, there is not an agricultural paper published here but what would notice it. His bovine majesty would be visited by reporter after reporter, and his master noted far and near as the owner of the wonderful beast. Yet at the end of five years his possible descendants would not exceed 1,000, valued possibly for beef at \$75,000 (and it is only their value for beef or other ultimate ends of their production that is to be considered), and if 20 per cent of this value was due to him, it would make his money value to the State \$15,000. Now there can be no question but that it is as easy to find some improved variety of grain, like Blont's corn or Clawson wheat, which will under the same culture out-yield the common 20 per cent, as it is to find an animal whose descendants, under the same care and with the same amount of feed, will out-weigh the common stock at the shambles. But if in some corner of a Washtenaw county farm there was a single stalk of corn which, by a systematic course of selection and breeding, had had its characteristics so fixed that it was capable of increasing the productiveness of its descendants 20 per cent, no one would think it worthy of notice. I doubt if there are a dozen men here who would go a mile to see it. The matter would not be thought worthy of the thinnest kind of a local, even in your town papers, and yet if the descendants of this plant were as carefully increased and preserved as were those of the bull, they would amount at the end of even the third year to 1,000,000 bushels of ear corn, valued at \$25,000, and if 20 per cent of this was due to the improved seed, we would have \$50,000 against the \$15,000 of the much-lauded bull. Again, our State Agricultural Society holds a great annual fair, at which they offer thousands of dollars in premiums, and to attend which the farmers of the State expend thousands more, besides taking time at the very busiest season of all the year; and for what object? They tell us that these fairs are worth many times what they cost in the encouragement they give to the improvement of the quality of farm products; that the premiums and accompanying honors are given as a reward for the time and care taken in producing the better animals and grains. Let us look at this premium list. We find that in 1880 the society offered premiums for cattle amounting in the aggregate to about \$4,000; for wheat, including flour, premiums, amounting to \$64; for corn and meal about \$40. Now, bearing in mind the professed object of the society, and the fact that the profitable

returns in the case of grains depend as much upon the quality of the seed used as do those of the cattle-raiser upon good stock (in proof of which I would simply say that Dr. E. L. Sturtevant, of Massachusetts, found a difference of 100 per cent in the yield of two large fields of corn as the result of using stocks of the same variety received from different sources, and in my test-garden last summer I found a difference of 400 per cent in the yield of different stocks of red Weathersfield onions treated in the same manner, even to the extent of having the same number of plants in a row), under these circumstances we should expect the amount of the premiums to represent the relative importance of these products. Do they? I have no data at hand later than 1873, when the estimated value of all the cattle, cheese and butter, as given in the Michigan census, was about \$24,000,000, and that of the wheat crop \$18,000,000, corn \$9,000,000. So that the premiums amount to one cent for each \$60 worth of cattle and the relatively munificent sum of one cent for each \$2,500 of wheat and corn. Do not these figures show clearly that, although we may admit the individuality of the seed, practically we do not act upon or appreciate it, and have not I a right to claim that the first and great obstacle in the way of maintaining good seed is this want of appreciation of their value?

Another difficulty is found in the wonderful variability of the vegetable kingdom, especially of cultivated vegetables. All our cabbages, broccoli, etc., have probably descended from one species and certainly from not more than four or five, and many (we might almost say any of the) varieties can be developed from another if care and time enough are taken; but last summer I had growing in my garden upwards of 50 distinct varieties. One of these, the Early York cabbage, scarcely expanded its dull, unattractive leaves at all, so early did it commence to head, and no sooner was the head formed than it commenced to decay and the plant died, its stem never exceeding 10 inches in length, and at all stages it was one of the most unattractive of plants, which no one would think of cultivating for its beauty; but in the Isle of Jersey, cabbages which originally came from the same stock as this, grow to the height of 12 to 16 feet, and the people make walking sticks and even rafters for their barns from the dried stalks, and the plant never heads at all; and I was told by one whose taste in matters of the beautiful is unquestioned that the most beautiful plant in all Detroit was a plant of variegated curled kale, at least a cousin of my homely cabbage. One who has studied the cultivated *cucurbitaceæ* most carefully, having had over 1200 varieties in cultivation under his own eye, is of the opinion that all our cultivated melons, squashes, gourds, etc., can be referred to three species; but Darwin reports finding one fruit

000 times larger than another, and then infinite variation of color and form are familiar to you all. Nor is this variation confined to the botanically unimportant elements of size, form, or color. The common Zonale geranium shows within the same species varieties which need almost as much water as an aquatic and those which only thrive when as dry as a cactus; sorts which must be most severely pruned in order to bloom and those which will not flower if touched with a knife; winter bloomers and those which blossom only in the summer; annuals have been developed into biannuals and biannuals into annuals; in short, to quote Darwin, who says, in *Variations of Animals and Plants under Domestication*: "It will not be disputed that we have instances of great variability in organs of the highest physiological importance." But you quote back from the same author that "we may infer that

the variability of cultivated plants in the above respects is due first to their being subjected to somewhat dissimilar conditions, and secondly to their being often intercrossed," and say that it is only necessary to start with a pure stock of any variety and absolutely prevent its being mixed with any other in order to maintain its purity and quality. My only reply is that of the boy who, when he hears one telling what can be done, but the possibility of which he doubts, cries, "Let's see you do it." Every seed-grower of experience has learned to his cost that there is an inherent tendency to variation in all of our cultivated varieties, which will show itself in spite of similar conditions and freedom from mixture of other sorts. In one case a stock of peas was developed from a single plant on an island in the St. Lawrence river, on which there was absolutely no other peas of any sort grown, but this stock ultimately so sported from within itself as to have the appearance of being a mixture of several varieties. Indeed all the descendants of a species seem to be moving on in the same line of variation, even if under the most dissimilar conditions. An illustration of this is found in our common Zonale geranium, which after being cultivated for many years and sporting into many different varieties, developed in the same year from three distinct and entirely separate strains double varieties, a sport which was not to be expected in a plant of the botanical character of the geranium, and one which the plant had shown no tendency to produce before. Similar illustrations are found in the almost simultaneous production of many varieties of potatoes of the Early Rose type, and more recently in the numerous white grapes of similar appearance developed among seedlings of the Concord, so that we not only have the well recognized variability which is the result of dissimilar conditions and intercrossing, but a tendency to variation independent of these, along a line the course of which we are utterly unable to predict. These sports as we call them are not the result of mere chance or the product of a combination of circumstances not made before, but are simply one of the ways of God's working which even the scientist of our day has not been able to formulate into a "natural law," and so take out of his hands and relieve him of all responsibility for. I have called attention to some of the less obvious difficulties in the way of securing good seed. There are many others, such as the growing of the seed in the climate best adapted to it; the effect of different soils upon them; the prevention of intermixing when in the field or store; the preserving them so as to retain their vitality, and a host of others which, I can only assure you, one who undertakes to grow or handle seeds upon any considerable scale will find far greater than he expected. I should be glad to speak of some of these, but recent experience has taught me that even on Thanksgiving day if "there is more to follow," it will not do to take too much time for the first course, be it ever so good, and I give way to the richer, more spicy articles that are to come.

After Mr. Tracy closed, Mr. H. E. Hooker remarked at some length upon the same topic, saying among other things that seedsmen had very great difficulties to surmount. In the proportion that the type is refined the difficulty of maintaining that type is increased. Long ago he had given up raising his own seeds because he could not grow as good ones as the professional seedsmen would sell him.

Prof. Daniel Putnam of the State Normal School next addressed the convention upon

THE SCHOOL GARDEN.

There is a peculiar fitness in associating the school and the garden. The most famous of all the schools of antiquity had its birth and its early development in the beautiful grove of Academia and in the lovely garden of Plato.

A short distance out from the busy streets of Athens, beneath the delightful shade of olive trees, surrounded by temples, statues and sepulchres of illustrious statesmen and heroes, Socrates disputed and his greater disciple discoursed and taught. Groves and gardens, sound learning and moral excellence have a natural affinity and attraction. They should live and flourish together in Michigan as well as in Greece.

The topic seems to invite one to draw a picture of what a school might be, surrounded by the beautiful both in nature and art. The task of painting such a picture in words, if one had the requisite skill and taste, would be a most agreeable labor, but I am persuaded that a better service can be done for this society and the State.

I shall, therefore, turn quite aside from this inviting aspect of the subject, and attempt to present a view which, while less alluring, will, I hope, prove to be of more real and permanent interest, and will help to direct public attention toward the object at which this society is aiming.

The topic to which this paper is to be devoted I understand was discussed, to a considerable extent, at the last annual meeting of the society; upon certain aspects of the questions naturally suggested by the subject very little remains to be said.

The papers and letters published in the report for 1879 have treated very fully and ably of the neglected condition of many of the houses and grounds belonging to our common school districts, and of the obvious demand for improvement in both. Even the personal experience and observation of all my early years of school-life in a New England country school-house, which stood close to the highway and had no out-buildings of any kind, either for storing wood or for any other purpose, do not prepare me to add any touches to the vivid descriptions already given.

It would be unjust, however, to convey the impression that no improvements have been made. Here and there a district has lifted itself above the traditional idea that a barren lot of a few rods square and a shapeless hovel constitute the proper home and surroundings of childhood. Full credit should be awarded for all that has been done or attempted.

No cause, however good, is helped by over-drawn pictures of the evils to be eradicated, or by even good-natured caricatures of objects, a truthful account of which would be amply sufficient. It is well to recognize and encourage the feeblest efforts in the right direction.

Without further argument or illustration, it will be conceded by every intelligent person that it is exceedingly desirable to secure largely increased interest in the ornamentation and care of school-houses and school grounds. If this interest can in some way be commanded, it will be comparatively easy to determine what trees shall be set out, what shrubs shall be planted, and what flowers shall be cultivated. It will then be no difficult matter to find teachers and pupils who will enter readily and enthusiastically into this good work.

The first and most important question is: How can the officers and people of the school districts be brought to feel and to manifest a genuine and hearty interest in this subject? Such an interest as will induce them to make a be-

ginning, in good earnest, of the work of putting their school-houses and grounds into proper condition?

Upon reflection I have come to the conclusion that I can do the society and the cause the most efficient service by suggesting some considerations which may possibly, if fairly weighed, tend toward the creation of such an interest.

The field from which these considerations may be gathered is so wide that your attention will be invited to only a few of them, and even these cannot be presented in all their bearings and relations.

I shall select considerations which are forced upon us by the circumstances and discussions of the times, and which as citizens we cannot safely allow to pass without candid and careful examination; for they have to do with the very existence of our public school system.

I will venture, therefore, to put the leading propositions which I desire to discuss in this form:

I. First our common school system is in some, and possibly in serious, danger of being destroyed, or at least so changed that its value will be very greatly impaired.

II. In order to secure the perpetuity and greatest efficiency and usefulness of our public schools, the reform and improvement aimed at by this society and other kindred reforms and improvements must be made.

III. The danger alluded to, and the possibility of averting it by means of such reforms and improvements, ought to be the strongest motives which can be offered to induce right action on the part of all friends of the schools.

If the first and second propositions can be shown to be only possibly true, or to have strong probabilities to support them, the third proposition will not need to be urged or argued.

It will, I presume, be conceded that our public school system rests for its support upon the deeply-seated conviction in the minds and hearts of the people that it constitutes one of the broad and firm foundation stones, or one of the mighty, massive pillars, upon which our political and social institutions are based.

We have been taught that the common schools are fountains of intelligence and virtue, and that without them and their salutary influence a republican form of government and republican principles can not be sustained.

If this conviction should be eradicated from the minds of our citizens, if the mass of our people should come to believe that the common schools are not necessary to the stability of the government, and that they are not nurseries of morality and virtue, it is not to be supposed that the taxes demanded for carrying on the schools would, for any length of time, be either voted or paid.

Money is contributed to build houses and pay the wages of teachers because it is believed that, on the whole, the outlay is a good one, that fair returns are received for the investment.

If it should be made to appear, after careful examination, that this expenditure of money is not a profitable one, and that no adequate returns are received, the result can be easily predicted. The school-houses would be allowed to decay, and the school system would soon become a thing of the past.

I desire to call your attention, for a few moments, to some views and opinions respecting the schools, and the results produced by them, held and published by men who claim, at least, to be well-informed and intelligent.

The North American Review, one of the oldest and ablest of our periodicals, in the number for the current month, contains an article entitled "The Public School Failure."

If the writer of the article lacks information upon the subject in any particulars, he more than makes up for this lack by the vigor of his assertions and the strength of his denunciations.

He commences by affirming that "there is probably not one of those various social contrivances, political engines, or modes of common action called institutions, which are regarded as characteristic of the United States, if not peculiar to them, in which the people of this country have placed more confidence, or felt greater pride, than its public school system. There is not one of them so unworthy of either confidence or pride; not one which has failed so completely to accomplish the end for which it was established. And the case is worse than that of mere failure; for the result has been deplorable, and threatens to be disastrous."

After declaring the whole system a disastrous failure and worse, he says: "According to independent and competent evidence from all quarters, the mass of the pupils of these public schools are unable to read intelligently, to spell correctly, to write legibly, to describe understandingly the geography of their own country, or to do anything that reasonably well-educated children should do with ease. They cannot write a simple letter; they cannot do readily and with quick comprehension a simple 'sum' in practical arithmetic; and they cannot tell the meaning of any but the commonest of the words that they read and spell so ill."

"This is the *intellectual* result of the operation of our own much-vaunted 'American' public-school system during the last thirty or forty years."

"As a mere imparter of useful *knowledge* the public-school system has failed utterly."

Having proved, to his own satisfaction, that the schools have entirely failed so far as intellectual education is concerned, he proceeds to establish the additional, and more fatal proposition, if it be true, that they are positively of no value as producers of virtue, morality or patriotism.

"Ignorance," according to this profound moralist, is not at all "the mother of vice," indeed "has no relation with vice."

On the other hand, he declares "crime and vice have increased year after year almost *pari passu* with the development of the public school system." Statistics are brought forward to show that uneducated and ignorant people are actually more moral, upright and law-abiding than educated and intelligent people.

His conclusions are that sixty-four million dollars are annually wasted, and worse than wasted, in supporting public schools, and that "a remedy must be found"—a change must be had.

Briefly the remedy proposed is this: "Those children only should be educated at public cost whose parents are too poor to give them even an elementary education," and these children should be instructed, at the public expense, only in the elements of reading, spelling, writing, and the common rules of practical arithmetic." In other words, public schools should be provided only for the pauper portion of our population.

Another writer, in the Popular Science Monthly, a magazine which claims to lead the van of the grand army of "progress," attacks the schools, in quite another direction, and attempts to prove that the education which merely teaches children to read, spell, write and cipher, is much worse than no education, so far as the good of the State is concerned.

Having thoroughly berated the "demagogues," who are usually supposed to exercise their arts most successfully upon the ignorant, he goes on to declare:

"It is not the illiterate classes, by any means, that are most misled and cheated by the demagogues. It is those who can read the newspapers and campaign documents that are most easily accessible to the flatteries, deceptions and cunning artifices of wily political managers. The illiterate classes are indeed, to no small degree, protected by their very ignorance from the most insidious forms of political imposture. The great mass of the people have a smattering of education and the whole system of demagogical art assumes it and is adapted to it. The common schools teach just enough to turn out 'powder and ball' for demagogues."

The arguments of this writer are intended to prove that the mass of the people should be taught much more and much better than they now are in the public schools, or they should not be instructed even in the elements of knowledge. The conclusion is that the schools should be improved and elevated or they should be destroyed.

Between these two reformers the public school system will evidently find great difficulty in standing where it now is, and still greater difficulty in attempting to move in either direction. One demands less and the other more. It will be a hard matter to satisfy both.

These two writers, Mr. Richard Grant White and Mr. Youmans, are not, in themselves, very alarming objects, nor specially to be dreaded.

But they are representatives of two classes which are already considerably numerous in the country, and which are apparently increasing.

Besides these two classes, there is one other, composed mostly of the members and leaders of one or two religious organizations, which declares that the State has no right to educate, and that all systems of instruction controlled by the State should be at once and forever abolished. The public schools are denounced, not because they fail to teach reading, spelling and practical arithmetic, but because they do or do not inculcate certain articles of faith and certain forms and observances which are supposed to be of vital importance to human well-being.

Now, whatever we may think of the assertions and arguments of the men whom I have quoted and of others who might be quoted, they are among us and about us. They will speak and write. They will be listened to and read. They will exert an influence which must be felt, and will be felt, to a greater or less extent, in every city, village, and school district.

Those especially who are, by nature and habit, opposed to all expenditures which call for taxes and taxation, will be very ready to accept these assertions as true, and such arguments as valid, and to make them an excuse, at least, for denouncing and voting against all appropriations for improving the character of the schools and the condition of the school-houses and grounds.

How are these men to be met, and how are their statements to be treated?

These are questions of great practical importance to all friends of the public schools, and to the State and Nation.

They cannot be met by mere rhetorical declamation about the value of the common schools as the "people's colleges," as the safeguard of our institutions, and as the peculiar glory of our age and our country.

Their statements cannot be put aside by asseverating that our school system is a "sacred legacy," bequeathed to us by our fathers, to be transmitted by us to our children; nor by repeating the trite maxim that "intelligence and virtue are necessary to the support and perpetuity of republican institutions."

The truth is that in this period nothing is sacred in the eyes of the so-called "advanced thinkers." No creed, or institution, or custom can claim exemp-

tion from criticism, or from condemnation on account of age or of sacred associations. The mere fact that a thing exists, and has existed even for centuries, constitutes no valid reason why it should be allowed to continue to exist. It must prove, or its friends must prove, that it is worthy to live, that it is of value to the present generation and to the present state of affairs.

It will not, therefore, be sufficient to affirm and to establish the affirmation, that the public schools have done good service in the past, that they have sent out from their rude walls strong men and noble women; that they have been indeed fountains of purity and all excellence in other days. All this may be admitted or denied, and the real questions still remain.

What are these schools now? What are they doing for the State, for the community, and for the general progress of humanity at the present time?

Stage-coaches and canal-boats had a fitting place in the activities and affairs of previous generations, but the progress of the world has left them a long way behind. Has the age outgrown and is it ready to cast off the schools of our ancestors as it does their means of locomotion? We, or our children, will have to answer these questions over again in the near future. The duty of the hour is clear enough. We are to examine, with care and candor, what these men have already said, and other statements which they will utter in our ears. Admit all that is true; expose clearly, but in good temper, whatever is false or fallacious; shun no fair discussion, and shirk no real or fancied difficulties.

We may as well frankly admit that the schools are not perfect; that many of them are open to serious and damaging criticism; that they are not doing all that they ought to do in imparting intellectual instruction. We may also admit further that our common district schools have not kept pace with the general progress of the age in other things and in other directions.

The good people in many districts have greatly improved their farms and the grounds about their dwellings, but they have allowed the grounds about the school-houses to remain in the same shameful and disgraceful condition in which they were thirty or twenty years ago. They have replaced their own early, rude, and poor houses and barns by new and, in many cases, elegant ones. But the same dilapidated old school-house still opens its uninviting doors. They have provided tasteful furniture for their homes, and improved tools and machines for their farms, but the old hacked and battered benches and desks continue to torture their children, and to vex and discourage their teachers.

We may, still farther, be entirely honest with ourselves, and acknowledge with unfeigned humiliation that our schools have neglected the moral and æsthetic part of our children's nature; that they have not, to any considerable extent, been nurseries of good morals or of good taste.

We may make all these admissions, and possibly some even more unpalatable, and, after all this, affirm that the public school system is of vital importance to us as a nation, and that it must and shall be preserved. It has great and grievous faults and imperfections, but it is nevertheless of priceless value. It is obvious that our present institutions would not long survive its total destruction. Ignorance may not be the mother of vice, but certainly it is not the mother of virtue and morality. Half-educated people may be fit tools for designing demagogues, but the teachings of all history prove that people wholly uneducated are still more ready and fatal instruments in their hands.

Let us inquire now, briefly, what bearing this discussion has, or should have, upon the subject before us, the ornamentation and care of school-houses and grounds. Its value, as already stated, lies in the motives which it presents, or

ought to present, for entering upon and carrying forward with all possible zeal and earnestness this desirable improvement. Progress in this direction will not fail to insure needed progress in other directions. An interest begun here will spread itself over every part of the school. Better grounds and better houses will not only tend to make, but actually will make better schools, and will demand and will have better teachers.

In concluding I desire to emphasize, if I may be able to do so, a few thoughts.

I. The point is, that *improvement in our district schools is absolutely necessary*, if they are to be preserved and perpetuated. This idea should be, in some way, impressed upon every citizen of the State. The schools are now worth something, but they must be made of greater value in order fully to justify the expenditures for their support. This work of improvement should begin at once. It cannot safely be put off to some indefinite future.

II. Second, the improvement now under consideration will not only render the premises more inviting, but will help directly and largely to develop the æsthetic nature of the pupils, and indirectly but still powerfully to develop also the moral nature.

It will not be denied that beautiful surroundings have a natural tendency to refine the manners and cultivate the tastes of children.

But, without doubt, it will be denied by some that good taste has any necessary connection with good morals. However this may be, bad taste certainly has no tendency to make either a man or a boy morally better. And I think a very little reflection will convince any candid mind that a cultivated taste, the love and appreciation of the beautiful, and tasteful and pleasant surroundings do have an influence over the behavior, over the thought, the feelings, and the moral character, so far as character is manifested in the conduct.

Everybody knows that nine boys out of ten, and in most cases the tenth also, will conduct themselves better in all respects, and will use better language, will be more kind, respectful and obedient, when dressed in good clothes and with clean hands and faces, than when clothed in rags and covered with dirt. The whole demeanor and deportment of scholars, both in the school-room and on the play ground, are of a higher order, of a nobler character, when the yard, the house, the furniture, all the appointments are as excellent of their kind as money, time and care can obtain.

I am persuaded that the most serious and alarming deficiency in our present school system, and in our courses of instruction, is the lack of any proper and efficient moral training.

It is most certainly as important to the best interests of the community and of the State that children be thoroughly grounded in the principles of honesty, truthfulness, purity and integrity, as that they be acquainted with the rules of arithmetic or with the laws of grammar. The inculcation of right motives in respect to obedience to law and to regularly constituted authority, is fully as important to society as the ability to extract the square root or to solve intricate algebraical problems.

While intellectual acquisitions are by no means to be underrated, moral principles and correct habits should be estimated at their true value.

Another thing deserves to be remembered in this connection. There is an intimate relationship between morality and good intellectual scholarship, between virtue and wisdom. I am not unaware that this position is denied by some men, but I am entirely confident that the records of institutions of learning and the testimony of history will confirm its correctness.

Dr. Arnold, the great teacher of Rugby, says: "I have a strong belief in

the general union of moral and intellectual excellence. I believe that they may be, that they are sometimes separated, but I thank God I have never witnessed it yet; I have still found that folly and thoughtlessness have gone to evil: that thought and manliness have been united with faith and goodness."

The object which he had in view and toward which he directed his best efforts was to secure in the boys under his charge, "the inquiring love of truth (knowledge) going along with the devoted love of goodness."

I believe, therefore, most fully that better school-houses, better furniture, and more pleasant grounds are among the most direct and powerful means of making the schools, in every respect, more useful and efficient. These improvements will help very largely toward the production of greater excellency in scholarship and of character.

III. I have but a single other thought to present, as a final motion to induce attention to the subject before us. It is this: Education and intelligence are, in spite of all that may be said to the contrary, imperatively necessary to the progress and prosperity of any nation, State, or of any school district.

Horace Mann, whose authority in educational matters will hardly be questioned, says in his own peculiar and brilliant style: "An ignorant people not only is, but must be, a poor people. They must be destitute of sagacity and providence, and, of course, of competence and comfort. The proof of this does not depend upon the lessons of history, but upon the constitution of nature. No richness of climate, no spontaneous productiveness of soil, no facilities for commerce, no stores of gold, or of diamonds, garnered in the treasure-chambers of the earth, can confer even worldly prosperity upon an uneducated nation. Such a nation cannot create wealth for itself; and whatever riches may be showered upon it will run to waste.

"All the choicest productions of the earth, whether mineral or vegetable, will, in a short time, by some secret or resistless attraction, make their way into the hands of the more intelligent.

"Let whoever will sow the seed, or gather the fruit, intelligence will consume the banquet."

While there are exceptions to this general law among individuals, no exceptions can be found among nations, or among even smaller communities.

The same writer declares: "The declination of the sun towards the southern tropic is not more certainly followed by winter, with all its blankness and sterility, nor does the ascension of that luminary towards our own part of the heavens more certainly bring on summer, with all its beauty and abundance, than does the want or the enjoyment of education degrade or elevate the condition of the people."

"Considering education as a mere producer of wealth, it follows that the more educated a people are, the more will they abound in all those conveniences, comforts, and satisfactions which money will buy; and, other things being equal, the increase of competency and the decline of pauperism will be measurable on this scale."

The application of those truths to the work of securing the best possible school-houses, and the most beautiful grounds which can be had, is obvious.

These are in themselves grand educating forces. They exert a mighty and beneficent influence upon children, upon teachers and upon parents.

They will be among the means of preserving our public school system, and of rendering the instruction given in the schools more excellent, both intellectually and morally.

Permit me, in closing, to express the conviction that this society can do no

greater or grander work than the turning of the barren wastes of our school yards into shady groves and blooming gardens.

II. Dale Adams inquired if the secretary had made any advances in the matter of securing the coöperation of the superintendent of public instruction in the matter of school gardens?

The secretary said he had placed the matter before the department, but had succeeded in securing very little enthusiasm in connection therewith; and the head of the department thought very little, if anything, could be done by the State superintendent to secure better work in this direction.

Mr. S. L. Fuller, former treasurer of the society, took the floor for fifteen minutes, explaining the financial condition of the society, and urging that the people of Washtenaw come forward and add to the list of life members of the society. Six life members were added, to wit: Geo. W. Lawton, Lawton; S. W. Dorr, Manchester; Everett H. Scott, Ann Arbor; David Woodward, Clinton; L. D. Walkins, Manchester; Mrs. Mary E. Foster, Ann Arbor.

The next paper was by Prof. Alexander Winchell, of the Michigan university, upon

THE CLIMATE OF MICHIGAN.

It is fifteen years since I first endeavored to impress upon the attention of the people of Michigan the beneficial peculiarities of their climate. There is but one physical characteristic of our peninsula which is exceptional, and confers upon us any superior advantages—that is *climate*. Apart from climate, our soil is no more fertile than that of Ohio and Wisconsin; our primitive forests are no more abundant, our timber no more valuable; our water-powers no more numerous; our grasses no more nutritious. But our climate is exceptional; and it is exceptional to the great advantage of the agricultural and horticultural capabilities of the State.

My attention was first particularly directed to the influence of the great lakes, and especially of Lake Michigan, in the autumn of 1865, while making an economical and geological survey of the "Grand Traverse Region;" and the convictions first impressed by the vegetation of that region were confirmed by some precise meteorological comparisons published in my report* which appeared early in 1866. In August, 1866, I read a paper on "The Fruit-bearing Belt of Michigan," before the American Association for the Advancement of Science, at its Buffalo meeting.† At the Troy meeting of the same association, in 1870, I presented a more detailed paper, on "The Isothermals of the Lake Region," based on a much wider range of data than I had employed before.‡ In this paper, I embodied the results of all the meteorological observations ever published from within the limits of Michigan, as well as many observations then unpublished. As the object in view required comparisons, I collected similar data respecting more than fifty localities lying outside of the State. The Michigan observations aggregated two hundred and eighty-four years, and those of the other localities, four hundred and ninety-three years. A great amount of labor and research was expended in the compilation of the 132 tables on which the condensed published results were based.

* The Grand Traverse Region. A Report on the Geological and Industrial Resources of the Counties of Antrim, Grand Traverse, Benzie, and Leelanaw, in the Lower Peninsula of Michigan, 8vo., 82 pp., with Map, and Appendix of 10 pp. on Palæontology. 1866.

† Proceedings American Association, 1866, pp. 84-91.

‡ Proceedings American Association, 1870, pp. 106-117.

It had been my intention to embody these tables in the first volume of the geological survey of the State, which was then in progress under my direction.

With the view of bringing these most interesting generalizations before another class of readers, I drew up a paper on the "Climate of the Lake Region" for one of the most widely read of the literary magazines,* and this was accompanied by two isothermal charts and other illustrations.

My memoir read before the American Association in August, 1870, was appended, without charts, to my "Report of Progress," communicated by the Governor to the legislature of 1871, and is included in that report as published by authority.† It was supposed that this general presentation of the peculiar features of our climate would awaken an interest in the minds of the members of the legislature which would easily secure the requisite appropriation for publication. But, for some reason, the interest and importance of these results were not appreciated. There were special active influences at work adverse to the interests of the survey. I presented the subject at an evening meeting of the members, and finally, laid upon the table of every member, a copy of a pamphlet on "The Climate of Michigan," in which the salient points in our climatology were very briefly pointed out, and illustrated by isothermal charts; but, suffice it to say, the appropriation failed, and this, of course, ended my official connection with the effort to publish to the world the great and beneficent facts which constitute the only superior natural resource of our peninsula.

In 1873, I was called upon to furnish several chapters of information concerning Michigan, for Walling's "Atlas" of the State. One of the subjects discussed was Climatology; and in this paper, I presented again the numerical results of the studies which I had before completed. This paper was accompanied by four colored charts of isothermal lines. The first of these gives the isothermals for July and January; the second, for Summer and Winter; the third, for Spring and Autumn, and the fourth, for the year, and for the mean *minima* and extreme *minima*.‡ This makes, in effect, nine sets of isothermal lines. The memoirs embodied in Walling's Atlas were subsequently reprinted in a thick pamphlet, of 121 pages, accompanied by the same charts as were contained in the Atlas.¶

Though the efforts, of which I have given a sketch, have received no legislative appreciation, I do not rely on my own judgment alone, in declaring that they set forth, on a scientific basis, a body of generalizations possessing the utmost importance for the agricultural and horticultural interests of our State. My report on the Grand Traverse region was circulated during 1866. In the older portions of the State, it awakened some undisguised incredulity. This was participated in by Mr. Sanford Howard, then secretary of the State Board of Agriculture; and accordingly, in 1867, Secretary Howard made a tour of the region, and embodied the results of his observations in a contribution of twenty-four pages to the report of the Board of Agriculture for that year.§ Departing, as I was informed, with the full purpose of exposing the fabulous character of my report of the year before, he returned with a complete confirmation of all my statements, using very many of the same facts, and asso-

* Harper's Magazine, July, 1871, pp. 275-285.

† Report on the progress of the State Geological Survey of Michigan. Presented to the State Geological Board Nov. 22, 1870.

‡ On this chart the *minus* signs before the numbers denoting mean and extreme minima have been omitted by the engraver. These numbers express, of course, temperatures *below zero*.

¶ Michigan. Being condensed Popular Sketches of the Topography, Climate and Geology of the State. 8 vo., 121 pp. 1873.

§ Sixth Annual Report of the Secretary of the State Board of Agriculture of the State of Michigan, for the year 1867, pp. 79-102.

ciating them with very similar explanations and suggestions. Yet my own name is not once mentioned in the paper, nor would the reader infer that Mr. Secretary Howard was not absolutely the first man to publish these discoveries and conclusions.

My popular paper in Harper's Magazine was re-published in *Der Michigan Wegweiser*, at Hamburg, Germany, a periodical established to promote immigration into our State. It was also re-published in the scientific journal entitled *Zeitschrift der öster reichischen Gesellschaft für Meteorologie*, or *Journal of the Austrian Society for Meteorology*, at Vienna, volume viii, p. 40, February 1, 1873. An abstract of my paper on the "Isothermals of the Lake Region" was also published in this journal, volume vii, p. 351.

The report drawn up by Mr. S. B. McCracken on the resources of Michigan,* for use at the centennial exposition of 1876, draws a large supply of facts and generalizations from the papers previously published by myself; and for this indebtedness due acknowledgments are made. The report of the State board of health for 1878, contains an extended and thorough presentation of the "climate and topography" of the lower peninsula of Michigan, by Dr. Henry F. Lyster,† who, while drawing extensively from the published results of my studies in the geology, topography and climate of the State, gives adequate credit for materials used, and accords to myself due priority in the disclosure of the peculiarities of our climate. Dr. Lyster, in a few pages, takes the cream of a body of results which I had based on months of labor and thousands of calculated means.

In numerous other sanitary, pomological and agricultural proceedings, I have found these generalizations cited and re-produced. I am, therefore, encouraged to believe that I have not misconceived their importance. This belief is strengthened by the spontaneous request of the State horticultural society to read a paper on the climate of the State—that factor in the fruit-raiser's operations which is most completely independent of all human control.

The foregoing statements concern the history of investigation on this subject, and are important to be made for the sake of preserving the record; and also, for the purpose of indicating where the members of this society may find fuller details on the climate of the State than it is my purpose to present on this occasion.

Before my own researches on this subject, no one had as much as suggested the great amount of the influence of Lake Michigan upon our climate; and no one, so far as I am aware, had subjected the recognized influence of any of the great lakes to the test of exact statistics. Dr. J. P. Kirtland, of Cleveland, had published a note on the influence of Lake Erie, but aside from the phenomena connected with the growth of vegetation, and the presence of southern birds and insects, he recorded no exact data beyond a few single observations.‡ He states that killing frosts are about a month later on the lake shore than in the interior, and that, in a case of extreme cold, the thermometer marked about six degrees higher at Cleveland than at points some miles back from the lake. Mr. Loren Blodgett, at the commencement of my own researches, had published a "Climatology of the United States,"§ embodying a vast amount of exact information; but his isothermal lines march across our peninsula, and

*S. B. McCracken: *The State of Michigan, embracing sketches of its History, Position, Resources and Industries*, 1876, 8 vo. 136 pp.

†Sixth annual report of the secretary of State board of health of the State of Michigan, pp. 167-250.

‡J. P. Kirtland, *Am. Jour. Sci.*, II., xiii., 215 and 294.

§L. Blodgett: *Climatology of the United States and of the Temperate Latitudes of the North American Continent*, 8 vo. pp. 536, with charts. Philadelphia, 1857.

across the entire lake region, as if the whole surface were one unbroken land-area. Still cruder is the isothermal chart of the United States "as determined by the Smithsonian Institution,"* and published a year or two earlier than Blodget's work. It will be understood, as a necessary inference, that the charts based on the army observations,† as well as all previous attempts at isothermal charts, fail totally to detect the local climatic influence which, as we now know, bends the isothermal lines of our peninsula in the most extraordinary manner.

The peninsular situation of our State is something which arrests the attention of the most casual observer of the map of the northwest. It is not apparent to observation, however, that our State is also a climatic peninsula; and yet, extended observation shows that our climate, in its seasonal means, is a patch taken from the latitude of Ohio; while in the moderation of its extremes, it bears an analogy to the Floridian peninsula. Its climate is cut off from that of Wisconsin and Iowa by a barrier as abrupt and as real as that which limits our territory. That which constitutes the barrier in the one case, creates it in the other.

The nature of our climatic situation is exemplified in the comparative statistics of every cold wave which passes over the northwest. On the 18th of November, 1880, for instance, while the thermometer was 5° at Milwaukee, it stood at 18° at Grand Haven, and 10° at Port Huron. At the same time, it was 8° at St. Louis, 2° at Denver, 4° at Dodge City, Kansas, and 6° as far south as Fort Gibson, Indian Territory. On the 19th of November, while the thermometer marked 29° at Grand Haven, it was 13° at Port Huron; and farther south, it marked 14° at Chicago, 2° at Indianapolis, 11° at Louisville, and 8° at St. Louis.

The rationale of our peninsular climate is easy to understand. It involves only two fundamental factors: 1. The presence of a large body of water on our western boundary. 2. The prevalent westerly direction of our cold winds. Lake Michigan is a body of water 360 miles long and 108 miles wide, with a mean depth of 900 feet, and a superficial area of 20,000 square miles. You could sink, in this lake, the three States of New Jersey, Delaware and Maryland. It contains $18\frac{1}{2}$ millions of millions of cubic yards of water,‡ or in other terms, 3,400 cubic miles of water. This vast body of water maintains a comparatively uniform temperature. Three months of summer warmth do not suffice to elevate it much above the annual mean, nor three months of winter to depress it much below that mean. While the mean July temperature of the land, in the mid-latitude of Lake Michigan, rises to 74°, that of the lake surface does not surpass 51°. While the January temperature of the land sinks to 19°, that of the water does not fall below 40°. On the land, the whole amount of heat absorbed is accumulated within 50 or 60 feet of the surface; while on the lake, the agitation of the water tends to distribute the summer accumulation through a depth of 900 feet. The average temperature, and therefore the surface temperature, is lower than the surface temperature of the land, and must, consequently, during the warm season, exert a cooling influence. On the contrary, during the winter, the average temperature of the water, and therefore its surface temperature, is much above that of the land, and must, consequently, exert a warming influence on the contiguous regions.

* Patent Office Report for 1856. Agriculture, Plate iv.

† Army Meteorological Register, 1855. It is impossible to overestimate our obligations to the army officers who planned and executed the extended series of observations taken at the military posts of the United States.

‡ 18,536,033,400,000 cubic yards.

In fact, the mass of the water of the lake becomes an immense stove, holding such a store of surplus summer heat, that, during the winter it warms up "all out doors." If the constant radiation of the lake is so perceptible in mean winter weather, it becomes truly striking when the land temperature sinks to its minimum point, and the difference between the land and the lake amounts to 50° or 60° .

Observations have shown that even the annual means of the regions contiguous to the lakes are somewhat raised by the lake influence. The cooling effect in summer is not equal to the warming effect in winter. In other words, the mean temperature of the lake is a few degrees higher than that of the land. As this fact cannot be attributed to an influx of river water from more southern latitudes, and would seem to be only partially explicable from the probably higher temperature of river-waters in the same latitudes, it remains to seek an explanation of the higher mean temperature of the lake. Now, let it be remembered that the waters of the lake penetrate 900 feet toward the heated interior of the earth; and that it has been ascertained that on the land every 55 feet of descent beneath the plane of constant temperature brings us one additional degree of heat. It will thus appear that if the depth of constant temperature in the mean latitude of Lake Michigan is 60 feet, the water of the lake reaches to a depth where the terrestrial temperature should be 15° higher than the constant temperature beneath the land, which would probably be about the mean annual temperature of the locality. I have ventured to suggest, in former papers, that though the cooling influence of the local annual mean must have been felt by the earth, in the bottom of the lake, it must be still true that the bottom of the lake has felt somewhat the warming influence of the normal terrestrial temperature at that depth. It seems to me entirely reasonable, therefore, to maintain that the heat of the earth's internal fires contributes something to the excess of the lake's mean warmth over the mean warmth of the land. The great lake may, therefore, be conceived as held in a vast natural dish, which is warmed over the imperishable fire which we know to be imprisoned within the earth. When the temperature of the land sinks to -20° or -30° , that of the lake is sixty or seventy degrees higher; and the vapor which ascends from its surface is the literal similitude of the steam rising from a kettle heated over a domestic fire.

The other factor in our peninsular climate is the prevailing direction of the wind. Were the atmosphere perpetually calm, the contiguous land and superincumbent atmosphere would only be very feebly warmed by direct radiation; and this effect would be more than counterbalanced by a perpetual land breeze as long as the lake should remain warmer than the land. But the general atmosphere is always in motion. Warmed in winter, while passing over the surface of the lake, it conveys some part of the lake-warmth to the land, and the rigor of the cold becomes ameliorated, on the principle of a hot-air furnace. As the wind, by turns, moves from all directions, the lake exerts some warming influence on all the surrounding land. This is illustrated by the isothermal lines for the cold months, which are bent southward, on approaching the lake from either side. Evidently, that side of the lake which receives most wind from the lake-surface, will be most impressed by the lake-influence. Now, it happens that the Michigan side of Lake Michigan receives most lake winds during the cold season, because, as is well known, our cold winds approach from a westerly direction. Thus, in January, at Chicago, according to eleven years' observations, the winds from the west of the meridian are to the winds from the east of the meridian as $72:5=14.4$; at Milwaukee, for thirteen years, as

60:18=3.33; at Manitowoc, for eleven years, as 67:11=6.09; at Grand Haven, for one and a half years, as 34:16=2.1. A similar excess of westerly winds is shown for all the months of the year, except April and May, and especially the month of May.

In consequence of this prevalence of westerly winds, the east side of the lake is warmed in winter and cooled in summer. While, therefore, the winter mean at Chicago is $24\frac{1}{2}^{\circ}$, that of New Buffalo, in the same latitude, is 28° . While that of Milwaukee is 22° , that of Grand Haven is 26° . While the winter mean of Fort Howard is 20° , and that of Appleton 19° , the winter mean of Traverse City, farther north than either, is $23\frac{1}{2}^{\circ}$. In autumn also, the preponderance of westerly winds raises the mean temperature one to two degrees along the south half of the lake shore, and three to four degrees along the northern half of the shore. This is illustrated by the chart which hangs before us, where the red lines pass through localities having the same autumnal means. To the west of the lake region, the lines conform approximately to the parallels of latitude, but over and east of lake Michigan, they bend abruptly northward. The autumnal isotherm of 46° , which passes through Fort Winnebago, bends northward nearly to the extreme point of lake Michigan, a difference of latitude of about 185 miles. The isotherm of 47° , which passes through Fort Atkinson, bends northward to the Beaver islands, 192 miles. The isotherm of 48° is deflected northward an equal distance. The isotherm of 49° sweeps from Evanston, near Chicago, to the mouth of the Manistee river, a difference of latitude of 152 miles. The isotherm of 50° bends from Kensington, south of Chicago, to Grand Rapids, a difference of latitude of 97 miles. The favorable contrast diminishes in the southern portion of the eastern shore, since in November the cold southwesterly winds either miss the lake entirely, or are held at a lower temperature by mingling with wind which has not traversed the lake. To put the subject in another light, an investigation of the monthly means on the opposite side of the lake, during autumn, shows that the temperature attained at Milwaukee, Oct. 15, is not reached at Grand Haven until Oct. 20. The Milwaukee temperature of Nov. 15 is only reached at Grand Haven Nov. 23. The Chicago temperature of Sept. 15 is the same as the New Buffalo temperature of Sept. 21. These comparisons show that the warm season is lengthened, on the east side, about six to eight days, in the autumn. In 1865 the first killing frost in the Grand Traverse region was Dec. 2; in 1866, Nov. 15; in 1867, Nov. 18.

By a singular and happy exception, in the prevailing direction of the wind, we find that during the month of May, winds from the east of the meridian preponderate. This is shown from the tables again; since at Manitowoc the easterly winds in May are to the westerly as 37:26=1.42; at Milwaukee, as 62:24=2.58, and in April as 52:33=1.6; at Chicago, including north winds, which are her lake winds, the ratio of lake and land winds is, in May, as 44:40=1.1. Now, in May, a lake wind is a chilling influence, except when the thermometer is sinking below the growing temperature for vegetation. It is then an influence which prevents frost. It follows, therefore, that during the mild days of May, the eastern shore of the lake is exempt from the chilling and retarding influence of westerly winds; while, during a cold period, when, as a rule, the wind is westerly, the eastern shore receives the benefit of protection from frost. Thus on the 16th of May, 1868, a destructive frost occurred throughout Illinois, Indiana and Ohio, but did no damage in the Grand Traverse region. This unique arrangement seems to have been prompted by a beneficent regard for the interests of early vegetation on our side of the lake.

Westerly winds cease to predominate only in that month when they cease to be beneficial to Michigan. And yet even in that month they exist whenever the interests of vegetation demand. Not only do westerly winds cease to predominate at the juncture when they cease to be beneficial, but at the same juncture the warmer land winds from the east of the meridian become predominant. Both causes accelerate vegetation on the east side of the lake. A study of the means for a series of years, at places on opposite sides of the lake, shows that the temperature of Grand Haven, March 15th, is equal to that of Milwaukee March 21st; that of Grand Haven, April 15th, is equal to that of Milwaukee April 24th; that of Grand Haven, May 15th, is equal to that of Milwaukee May 28th. Remember that these are not comparisons of single instances; they are comparisons of the results of many years of accurate instrumental observation. They show that in May, Grand Haven is thirteen days in advance of Milwaukee. Add the thirteen days of growing weather gained in spring to the five days gained in October, and we perceive that the growing season is eighteen days longer at Grand Haven than at Milwaukee. Every practical cultivator knows that eighteen days often make all the difference between a crop well-ripened and perfect, and a crop immature and savorless, if not ruined by an untimely freeze.

This contrast is the same in kind as exists along the whole length of the two shores; but we find it qualified by two influences. First, the northern portion of the western shore receives a warming influence from northerly winds approaching over Green Bay; but at the same time, the greater expanse of water passed over by westerly and southwesterly winds approaching the Grand Traverse region imparts to that region a greater relative influence than is felt by the Grand Haven region. Secondly, the southern portion of our lake shore is exposed to the unmitigated sweep of southwest winds which, in the northwestern States, are often the coldest of all; but, on the contrary, this region receives northwesterly and even north winds which have swept over a vast expanse of lake surface.

It is not to be supposed that these climatic influences are confined to the immediate shore of Lake Michigan. Undoubtedly, they reach there their greatest development; but the tables which I have compiled, and place before you, and the isothermal charts which I exhibit, demonstrate that the whole of our peninsula receives a similar kind of influence. The President of our local horticultural society will inform you how many car-loads of peaches, grapes and other fruits have been sent out of Ann Arbor during the past season. Nor is it to be assumed that the western borders of our great lakes receive none of their equalizing effects. My own charts show that the northward deflection of the winter isothermals begins on the west side of Lake Michigan, many miles from the lake. This is also shown on the climatic chart of Wisconsin, published by Dr. I. A. Lapham, in 1865. My charts also show that a similar influence is exerted upon our peninsula by lakes Huron, St. Clair and Erie. I include Lake St. Clair, because it is always filled with water of the same temperature, except in the stagnant portions, as that of the great lakes beyond, and never cools down in winter, like a small isolated body of water. Moreover, the Huron peninsula lies in the lee of Saginaw Bay, and is another Michigan on a smaller scale. Thus, also, the south shore of Lakes Erie and Ontario are known to be greatly protected from unseasonable frosts and extreme winters, in spite of the preponderance of westerly winds along those shores.

I have thus far directed your attention almost exclusively to mean temperature—to the averages of months and seasons. These suffice, indeed, to indicate the length of the growing period and the average severity of the winter. But there is another aspect of climate which possesses at least equal importance; though in climatic discussions it has been largely overlooked. Published tables give us means of the year, and of the several seasons; and their authors seem to think that in this they have brought to view all the important elements of climate which bear on health and production of crops. A little reflection, however, shows that the *extremes* of climate are of equal importance with the means. It signifies little that the growing season begins in March, if liability to killing frosts continues to the middle of May, as in Tennessee. A mean October temperature of 60° is comparatively valueless after a September freeze. The mean temperature of a season may be mild, or even delightful at the same time that one or two days have brought a destructive cold. One killing frost is as bad as a dozen, for vegetation has but one life to destroy. It is the liability to these exceptional temperatures which we must know before forming final judgment on the adaptability of a district for a particular crop. A winter which averages mild may be marked, like the climate of St. Louis, by one, two or three mornings destructive to everything which would triumphantly survive all the rest of the season. Every fruit-raiser knows that it is not the average weather of winter or spring which endangers his buds or his trees. It is the one or two nights of the whole season which brings him apprehension—especially if accompanied by high wind. It is of no consequence that the winter mean of St. Louis is 33° , and that of Grand Haven 21° , or of Traverse City 24° , if the thermometer falls sometimes to -22° at St. Louis, and never sinks below -16° at Grand Haven or Traverse City. It is precisely against these exceptional extremes that lake Michigan exerts its most striking influence.

There are two ways to consider extremes of climate. We may consider the mean minimum of a locality, or its extreme minimum for a series of years. There is a lowest point reached by the thermometer at each locality every winter. Different winters may vary greatly in the severity of the coldest day, but we may take the average of a series of winters. This is the mean minimum. It indicates the lowest temperature which the locality is as likely to experience as to escape. Now, from this point of view, the Michigan climate stands forth singularly favored. I have with me a chart of mean minima, which members of the society are at liberty to inspect. You will be surprised to notice how the lines passing through points having the same mean minimum are bent northward along the region of the lakes. They do not trend east and west, as they must under the normal influence of latitude, but they run literally north and south in the vicinity of lakes Michigan and Huron. The isothermal of -15° strikes from Mackinac through Manitowoc, Milwaukee, and New Buffalo to Fort Riley, in Kansas, near the parallel of 39° . Here is a deflection over nearly seven degrees of latitude, or about 480 miles in a straight line. The meaning of this is that the most excessive cold at Mackinac, for a period of twenty-eight years, is not, on the average, greater than at Fort Riley, 480 miles further south. It is one degree less than at Chicago for a term of eleven years. There is but one feature about our climate which is more striking, and that is the isotherms for extreme minima.

Suppose we note the lowest point reached by the thermometer in a series of years, at each of fifty localities. These points are the extreme minima of the

several localities. Now, drawing a line, on a map, through all the localities which have the same extreme minimum, we have an isothermal chart for extreme minima. Such a chart I present before you on an enlarged scale. Its features are similar to the chart of mean minima, but still more pronounced. By a glance at this chart, we perceive that the lowest point reached at Mackinac, in 28 years, is but two degrees lower than the extreme minimum of St. Louis. Extreme weather at Chicago is twelve degrees colder than at New Buffalo. The lowest extreme of Milwaukee is fourteen degrees below the extreme minimum of Grand Haven; while the extreme of Fort Howard is twenty degrees below that of Northport. In general, while the mean minimum along the west side of lake Michigan is -16° , that along the east side is -6° ; while the extreme minimum on the west side is -22° to -30° , that of the east side is -10° to -16° , as far north as Little Traverse Bay. On that day of memorable cold, Jan. 1, 1864, the thermometer sank to -30° at Milwaukee, but only reached -14° at Northport and Traverse City. At the same time it was -29° at Chicago and -20° at Kalamazoo. It sank to -24° at St. Louis and -16° at Memphis, Tennessee. This point was two degrees colder than Northport, 640 miles further north in a direct line. The isotherm of -24° bends from the latitude of Alpena through Grand Rapids, Battle Creek and Coldwater, and thence to St. Louis, 452 miles further south. Cincinnati is reported to have an extreme minimum of -29° , a degree of cold not known in our peninsula, and but little exceeded along the south shore of Lake Superior. At Ann Arbor, the lowest point reached in 28 years, according to my own observations, is -24° . The area of this extreme minimum seems to cover all the central portion of the peninsula east of Grand Rapids, west of Bay City and south of Otsego Lake, and stretches southward into central Kentucky. Compared with Traverse City, the extreme minimum of Hazlewood, Minn., is 22° lower; that of St. Johnsbury, Vt., 28° lower; that of Gardiner, Me., within 30 miles of ocean, 19° lower; and of Montreal, P. Q., 26° lower.

These illustrations of the general principles announced must suffice for the present. This is not an occasion for entering into greater detail. The details must be conned over deliberately, in the presence of the charts which represent them graphically. For this purpose, I must refer you to the papers whose titles have already been cited. Better and more satisfactory still would be the study of the full tables of mean and extreme results on which these discussions have been based. Meantime, I hope I have made it clear that in our exceptional climate, we possess a natural resource which ought to be studied both by the public and the private citizen, and which, utilized to the fullest extent, will enable us to produce the crops suited to the lower Ohio valley, with a more certain exemption from unseasonable frosts than is enjoyed by Kentucky, Missouri, northern Texas, or the much-coveted Indian Territory.

The meeting now adjourned for the night.

Wednesday Morning.

The convention was called to order by the President at an early hour. Prayer was offered by Dr. Lockwood, followed by music rendered by Mr. Nathan White and family.

Mr. Cottrell moved that a committee of five be appointed by the chair to nominate to the convention at the proper time a list of officers for the ensuing year. Carried.

On motion the executive committee was instructed to elect three delegates to the convention of Michigan agricultural societies.

THE DANGER OF OVERDOING FRUIT CULTURE IN MICHIGAN,

was the first topic on the programme for the morning session, and Mr. S. W. Dorr of Manchester led off the discussion by saying:

It seems to be expected of me to point out to this intelligent audience some of the perils or dangers of overdoing fruit culture. The word danger implies exposure to death, loss or injury to our bodies or property, risk, peril, loss of money or labor. To be forewarned is to be forearmed, or placed in position to resist danger.

IS THERE DANGER OF OVERDOING FRUIT CULTURE ?

To an audience who have come together to-day for the express purpose of gaining information in the science of horticulture, this, indeed, is a very important question, but we are compelled to admit the force of the question when we look out upon our once well-paying orchards now so plentifully dotted with piles of nearly worthless fruit, half covered with snow, while many of the surrounding trees, still heavily laden, glisten in the morning sun, and assent to our inquiry, "Is fruit culture overdone?"

But, says one, this is a peculiar season! We admit it,—an abundance of fruit, and labor and money expended, with but little returns. In seasons of great abundance like the present, when the apple crop will only pay the grower for picking and hauling, and in some localities not even that,—after years of toil and labor, in planting and pruning, and anxious waiting for our orchard to come into bearing, and now when our efforts are crowned with success, and the grower has a surplus of fruit, no wonder we feel disappointed and despondent. But what is the remedy? Shall the labor of years be cast aside in a moment of despondency? Shall we lay the axe at the root of the fruitful tree—cut it down, and cast it into the fire? Is the day at hand when the fruitful shall suffer the penalty of the unfruitful, or the just the penalty of the unjust? May we not rejoice in the thought that our fruit is so abundant that every household in our broad land may have a bountiful supply, and peradventure the common class of people in Europe may have an opportunity of testing our Michigan apples?

To those who anticipate planting orchards it may be well to remember that the farmer who raises a few hundred bushels of surplus fruit which he allows to remain in the orchard until half are fallen to the ground, or otherwise unfit for use, or gathers after all the ordinary farm work is done, and sells to the first man that will make him a bid, the outlook from our present standpoint is not very promising for remunerative prices, or in other words, to him fruit culture will undoubtedly be a failure.

There always was, and probably always will be a class of farmers who do *all* their work in the same slack, bungling manner. Shall we therefore come to the conclusion that farming is a failure? Not at all.

The same may be said of the mercantile man, the same of the professional man; those who succeed are those who make a life-long study of their profession, and by diligence and untiring perseverance work out for themselves a reputation.

It may be well to go through our orchards and weed out the old worthless varieties; for we must admit we have all fallen into the same error, of plant-

ing too many varieties; in our fruit catalogue as it now stands, comprising 236 varieties of apples, only five are marked 10 in the scale for market; therefore, we may safely conclude there are not more than ten or twelve varieties worth cultivating for market.

Years ago, prior to the formation of this society (which is now holding its tenth annual meeting with us), we labored under many disadvantages in regard to information, on this and many other points, but at present any one desirous can readily acquire all the information necessary by consulting the annual reports of this society. Again, the fruit-growers of Michigan need to place themselves in better position with railroad and other transportation companies, so that our fruits may not be delayed on the road to market, packages broken open, fruit destroyed, excessive charges demanded, etc.

From the most reliable information we ascertain that although our fruit crop exceeds in quantity that of 1878 or any former year, yet not one-half of the crop has been gathered and secured, and the late cold weather ruining much that was supposed to be secure, we may anticipate a shortage in the amount available, and look for an advance in prices of fruit in fine condition. Indeed, in looking over the markets of green American apples in the London markets, which are quoted from 20 to 26s sterling, we see no great reason for discouragement to the Michigan fruit grower.

Also the exportation of dried apples from New York, for the week ending November 27th, amounted to 6,741 bbls.

In order to make fruit culture a success, and the business remunerative, we hope to see active measures immediately taken to work up our surplus and second quality fruit by establishing more reliable dryers—manufacturing into jellies, jams, etc.

In conclusion let me say, I anticipate more danger from negligence than from overdoing fruit culture. The time is fast approaching when the farmer will no longer dabble in fruit culture,—when the man that makes fruit-growing a specialty will also make it a success.

With a soil and climate peculiarly adapted to the growth of fruit, and almost surrounded as we are by numerous fresh inland seas to temper the cold blasts of the winter winds, together with the many advantages of transportation by water and by rail, I feel confident that the fruit-grower need have no fears for the future of fruit culture.

Judge Lawton.—I think there is more danger from waste than from overdoing. When there is an immense amount of fruit a good deal of it is lost from negligence. One danger is in not utilizing as we ought what we grow. I have thought at times, that there would never be any danger of overdoing fruit culture, because of the rapid increase of noxious insects, and I doubt not when the curculio, codling moth, currant worm, etc., etc., have invaded your fruit grounds, you have all shared with me in this thought. But Professor Cook, in his lecture, gave us rather disheartening words in this direction. It really looks as if with pyrethrum, London purple, etc., we were going to come out ahead in this fight. On the other hand, however, Dr. Winchell showed us in his admirable lecture how fortunate we were in our climate for the production of fruit, and at the same time illustrated how unfortunate the great west was and how we are on the eastern rim of this vast country, to be supplied very largely with good fruit from our Michigan. I have shipped peaches during this year to Bismark and Winnipeg successfully. Cheap transportation is our great problem. *Good fruit will always be profitable.*

J. D. Baldwin.—This question originated with our branch society, and

another part was added thereto: "How shall we utilize our fruit to make it most profitable?" Hundreds and hundreds of bushels of peaches rotted with us, and were of no use to anybody the past season. How shall we save it? What plan shall we adopt to get it all into the market? We are assured it is all wanted somewhere, but in a prolific season, how are we to get it into the hands of the consumer? I have in my hand, a sample of peach jelly which I wish you to test; perhaps in this article we can dispose of some of our crop. We need cheap dryers that can be put upon any fruit farm. The using up of all the fruit crop makes a great deal of labor, which it is good to employ if the prices of the products will only warrant it.

J. Austin Scott.—The danger is not in overdoing, but in not getting fruit enough. Men who raise choice fruit, and market it as they ought will always make it remunerative. The trouble lies in this: There is not discrimination enough shown in the selection of fruit for market. Most orchardists do not seem to realize the extra value that is put upon first grade fruit. The apple belt is narrow, and the belt in which apples are eaten is large.

Mr. H. C. Sherwood, Watervliet.—The first question amounts to nothing. People are always harping on overdoing business of this kind, but the fact is, it is never overdone. Farmers, especially, underrate the apple crop. They will rather see the fruit rot than to sell it at what would net them per acre more than any crop they raise. They seem to delight in getting things by the hardest, and will not even utilize the more promising methods of getting money. Mr. Sherwood described his fruit-house as follows:

My building for packing and storing fruit is thirty feet square, built on a hillside; the lower story, which is used exclusively for keeping fruit, is of stone, much the same as an ordinary cellar; the entrance on the lower side being on a level with the drive-way leading to it. The inside of cellar wall is ceiled so as to allow of packing four inches of sawdust between the boards and wall. The joists overhead are also ceiled and should be perfectly tight so as to prevent the sawdust sifting through, then pack well between the joists with sawdust. This is done, of course, before laying the floor. I used one and one-half inch flooring, planed and matched. The entrance to this floor is from the upper hillside and only a slight elevation above the drive-way. This floor is used for storing carriages, and also allows a large space for packing peaches, grapes, and other fruits in their season. The upper story is for storing fruit baskets, packages for shipping, light implements used in cultivating and securing the fruit. This floor is of inch stuff, planed and matched. I admire this, as it is much easier to keep clean and in order. The two upper stories are each nine feet in height, with plenty of windows and blinds to regulate the ventilation and light of the rooms.

To return to the cellar, which is the principal feature of the building: It is seven feet, in the clear, in height. I have a two-inch white oak plank floor laid here, believing this to be the most desirable in any cellar, used for storing either fruit, milk, butter, or any provisions for the house. From the cellar there is a ventilator extending to the top of building—this is 12x8 inches inside, to which is attached a damper to be used in regulating the temperature. The doors of cellar are double, one opening out, the other in, with space of eight inches between them. The space need not be packed if the doors fit tightly. They are broad enough to admit a team with loaded wagon. The windows are arranged for ventilation and light with double set sash, a wire screen outside, and a close fitting slide door inside, so as to exclude the light when desired. There is an entrance from carriage room by staircase with

door above and below. A thermometer is quite essential. I find no difficulty in keeping the temperature so as not to vary more than three or four degrees during the whole winter season, whatever the condition of the weather even in such a winter as '79-'80. I keep the room at 2° above freezing, as I believe this to be best for keeping the fruit, although two or three degrees colder will not injure apples. I have kept apples in this cellar one year from the time of picking, in apparently perfect state of preservation, some of which were exhibited at the first fair of the Western Michigan Agricultural and Industrial Society, held at Grand Rapids in 1879. The expense of the cellar, as I have it built, is only a trifling addition to what an ordinary carriage house would cost, and will pay the whole cost almost every year in the advance price received by keeping the fruit. The cellar will store between five and six hundred barrels.

J. N. Stearns.—This year was a godsend to the fruit-grower, for if he managed rightly he made a fair-living, and there was so much fruit of all kinds that everybody could have an abundance. The people have got into the habit of using fruit more, and thus the market is widened for other years that are to come.

Mr. E. Buell.—There is not half enough apples stored for home consumption to-day. The trouble is not that there are too many; there is not enough, and you will all see this before the spring of 1881. There is an opening for our fruit abroad, if we will only put in practice the best knowledge we have in packing and shipping. Apples can be put down in Liverpool from Michigan for \$2 per barrel, and yield a handsome profit above that. I feel that there is an opening for our more perishable fruit in the home evaporation. I have some fruit here, the product of Mr. E. M. Potter's dryer, of Kalamazoo. It is as fine as you ever saw.

Mr. Potter not being present, Mr. H. Dale Adams read the following notes which had been forwarded by him:

For two or three years I have been looking up the subject of fruit evaporators or driers, not too expensive for general use. I have examined several portable driers and read all that I could get hold of on the subject, and find that in nearly all of them, the stove is so small as to admit only fine wood, which makes a brisk and short-lived fire, and either scorches the fruit or soon goes out; thus requiring constant attention. About the middle of last July, while consulting with my wife as to what we had better do about a drier, she said to me one day: "If I could use tools as well as you can I could soon make a drier, and not have it cost much either."

Of course such an appreciation of my skill had a tendency to inspire my inventive genius and could not go long unrewarded. After some head-work and a little labor, I made a drier which has done good work, as the samples of evaporated fruit which I have here on exhibition will testify. I laid up a brick-work of three sides, about thirty inches square and three feet high, inside of which I placed an old box stove, of large size, and on top of the brick-work I set a box 27x28 inches inside, and about 5 feet high above the brick-work, with a door in front, which, when open, would admit ten sliding trays 27 inches square. These trays were made of light basswood frames and mosquito netting tacked on the under side of the frames,—although they could be used either side up. The netting required replacing once during the season, and is now about used up.

In the evening my son or hired man would pare about a barrel of apples in an hour; one other person and myself would trim the ends, cut the apples half

in two, and our two little girls aged seven and nine, would spread the fruit on the trays and I would slide them into the drier. In this way we usually filled the drier in sixty or seventy minutes. It is best to have a good fire before you begin paring, as the sooner the fruit is subjected to the heat after being pared, so as to arrest decay by closing the pores of the fruit as soon as possible, the whiter it will be, and will retain much more of the saccharine quality and natural flavor of the fruit which would otherwise escape by a slower process, and as some heat escapes as you slide in the trays there is little danger of scalding the fruit while filling the drier. I should think we endeavored to have the temperature about 150°, although I never tested it with a thermometer, and perhaps about 120° after the fruit was partially dry. We had a ventilator, 6x27 inches, near the top, which could be opened or closed as desired, but should always be kept open while in use.

At bed-time we filled the stove with large wood, closed it tight, and in warm, dry weather our apples would be nicely evaporated in the morning. After the weather became colder and atmosphere more damp outside, we found it necessary to change the trays the next morning, putting the upper ones at the bottom, and turn them half around and replenish the fire. It takes longer to evaporate peeled peaches than apples, and still longer those that are not pared. Out of this little cheap drier we have taken over seven barrels of nice evaporated apples well pressed down, over one barrel of peaches like that sample and nearly one barrel of unpeeled peaches, besides some currants, corn, etc. I should have said that this drier being one inch longer from front to back than the trays, as will be seen by the dimensions already given, it admitted of a space of one inch at the back of the first tray, and also at the front of the second, and so on alternately. I have found this better than a half-inch space in front and back of each tray. I have made several experiments with this little drier and can see where it is capable of improvement. I now would build a drier for my own use somewhat different. I would make it about 30x40 inches on the inside and 8 to 10 feet in height, according to the height of the building in which it would be used. I would make the trays 20x30 inches and slide two trays in on the same cleats. I would make the drier all of one inch flooring or ceiling, well seasoned, and line it on the inside up about three feet from the bottom with either brick or galvanized sheet-iron. I think I would use the latter, as with this the drier could be made portable. I would think best to leave about three inches of space between the sheet-iron and sides of the drier, so as to render it fire-proof. I would use for the trays galvanized wire cloth, 5 meshes to an inch, which can be obtained of the manufacturer, John Snow, at Rochester, N. Y., for 7½c to 8c per square foot, according to the quantity ordered. The usual width of this wire cloth is 30 inches, although they will make any width desired if the quantity ordered is sufficient.

I would cover the top of the drier and have ventilators on opposite sides which could be closed more or less. Where the orchards are extensive enough to warrant the expense, probably there is nothing better than the Williams evaporator, made at Kalamazoo, and which will evaporate two hundred bushels of apples in 24 hours if worked up to its full capacity night and day. This has been done at Kalamazoo this season.

But it seems to me that every farmer greatly needs a cheap evaporator. By this means I know we have saved many barrels of fruit which were blown off, and would have gone to the cider mill or perished entirely. Apples which we could not have sold for 10 cents per bushel will bring us now 30 or 40 cents,

after deducting all expense of drying, which really was nothing comparatively except interest on cost of drier and knotty wood. It was really a play spell for us in the evening to see how quickly we could fill that drier, and far more pleasant than sorting over apples every few days all winter.

One bushel of apples will make five pounds of good evaporated fruit, worth 10 cents per pound, and will sell for that when sun and kitchen dried apples are slow at 3 to 3½ cents. The fruit which I have here was bleached by placing on the hot stove in the drier a small piece of roll sulphur, when the apples were first put in, and closing the ventilation for a minute or two.

I will make the following as requisites of what I think necessary in a good drier:

First, It should be located inside of another building where it will not be subject to the changes of temperature outside, or the winds.

Second, It should admit a stove which will take in large wood, which will keep up a steady and uniform heat.

Third, The pipe from the stove should pass into a chimney with a good draft, or be extended high enough to avoid any danger of smoke being blown back into the drier by an adverse wind.

Fourth, It should be made of ceiling or good, matched flooring, not much, if any, less than one inch thick, and be provided with a door or double doors on one side, which can be closed tightly.

Fifth, It should be tall enough to cause a good current of air up through the drier and out the ventilators.

Sixth, The lower tray should be not less than 24 inches from top of the stove, so as to avoid any danger of scorching the fruit, which it will do if the fruit is nearly done and fire too hot.

Seventh, The trays should be at least three inches apart, and have a space of two inches in front of one tray and at the back of the next, and so on alternately, which gives a current of hot air back and forth as it ascends, thus carrying with it the vapor; and further, the hot air when in rapid motion is not so likely to scald or scorch as if the transit were slower.

Eighth, There should be a small space near the bottom of the stove, admitting cool air, which will become heated before passing up through the drier. I think this might be effected by raising the drier, say a half-inch from the floor or grounds upon which it was placed.

Ninth, It should be so constructed as to avoid the least possible danger of taking fire.

C. R. Coryell, of Jonesville, spoke of a method of utilizing apples pursued in his vicinity in the making of an excellent quality of apple jelly. Herring & Son, of Allen's, make this jelly at fifty cents per gallon. The apples are thoroughly washed, and one-third sweet ones mixed with the acid apples. The jelly at first did not sell well on account of the spurious jellies on the market, but as soon as it had a good trial there was a market for all that could be made.

Wm. H. Schnyler said that they were getting to make all sorts of jellies that were worthless, yet in appearance fine—hence the jelly market was an uncertain one. There should be a law compelling dealers to brand the material correctly before putting it upon the market. I don't think there is any danger of over-doing the fruit business, but growers ship entirely too much green fruit. They should evaporate the poorer grades, only placing the very best upon the market green. There is no excuse for people shipping second quality fruit, or letting it rot, now that fruit driers can be had so cheaply. .

Mr. Arnold, of Ontario.—I would like to see such a standard of marketing that men could sell their fruit by samples shown in small boxes. If men would only sell such as they would be willing to show as samples it would work quite a revolution in our marketing.

J. S. Woodward.—I remember as a small boy of enjoying many a good bite at my grandmother's. One time it was a pumpkin pie of considerable dimensions, which seemed rather too much for my capacity; but upon being asked if I could manage it, made the remark that it was pretty big but I could grow to it. Just so with our fruit market, it will grow to us. We never shall raise too much fruit. We do not use half enough ourselves; there is not one family in a hundred that has enough. We must not cheat the pigs either, when we do our marketing; we could use ten times as much as we do on our own farms at a profit in money and good health. We have some men experimenting with us as to methods of keeping fruit in fresh state. I refer particularly to perishable fruit. They are succeeding with their house real well. I saw a quince cut in two and placed in their storage coming out firm, weeks thereafter, perfectly fresh. Tomatoes were kept a long time, and Hale's early peaches kept until time of late Crawfords, and were in good market condition. Yankees will keep up with the times in the care and use of fruit—never fear.

J. Lannin.—The great fault I find with our peach men is, they are increasing our market gluts every year by planting those same varieties that produce these over-full markets. We need in our purchase of trees to look out for this matter and fill in the spaces.

H. Dale Adams.—I shipped apples in a glut and secured \$2.05 per barrel, when ordinary apples were bringing only \$1.00. Time and knowledge of what to do, put into marketing, reaps its reward.

Mr. Collar of Adrian gave a little account of canning at Adrian as an outlet for fruit:

The Adrian canning factory commenced operations about five years ago, and has gradually increased its business each year since. This year it has absorbed more fruit than on any previous one. The company intends to enlarge its operations, as circumstances and markets seem to warrant. The following is a partial result of the season's work: 300,000 cans of tomatoes, 25,000 cans of beans, 15,000 cans of strawberries, 25,000 cans of apples, and 12,000 cans of pumpkin. The company manufactures its cans and cases. There has been paid out this season to farmers for produce over \$8,000; and 150 hands have been employed in preparing it for market. This season the company has paid per bushel for apples, 20 cents; tomatoes, 20 cents; cherries, \$1.25; strawberries, \$1.50, and raspberries, \$1.50. No pears, peaches, plums or grapes have as yet been canned; for pears there is a poor demand, and peaches and plums cost too much as green fruit. The company pay 75 cents for peaches, and \$1.25 for plums. The whole season's product was sold to one party. The enterprise is a success.

On motion, the further discussion of the topic was laid over until evening.

The treasurer made a full statement of the society finances, which is given later in this volume.

The business committee made a complete report, saying that a settlement had been made with the treasurer, and all accounts were found correct.

The following was the

SECRETARY'S ANNUAL STATEMENT.

Mr. President and Members of the Society:

It is not a pleasant duty to review our failures, but it does give us genuine satisfaction to recall incidents connected with the successful prosecution of any good work. In canvassing the labors of our society during 1880, and placing on record, as becomes my duty, an epitome of our transactions, I feel a wholesome pride in the results of our exertions. We may not have added greatly to the world's wealth or knowledge, but we have used a very small portion of the funds in circulation in a way that we can point with satisfaction to the results, and we have been enabled to disseminate some valuable knowledge among the people engaged in horticulture in Michigan.

Inasmuch as the secretary has directly to do with almost every effort of the society, you will pardon me, I know, for giving some prominence in this statement to the work of that officer, as in that way I can best explain the results of the year's endeavors.

REPORT OF 1879.

The manuscript for the volume of 1879 was entirely in the hands of the printer at the close of the year, and the printing and binding was so far forwarded that we had copies for distribution to members at the February meeting in Hillsdale. I like the plan of getting the volumes into the hands of the people who use them as early as possible, for although a great proportion of the matter is applicable to our work almost any year, still many things have a peculiar application to the time in which they are uttered. I find there was no State issued its horticultural report for 1879 as early as Michigan, and this is very largely due to the admirable arrangements and promptitude of the State printing establishment, under the direction of W. S. George & Co.

DISTRIBUTION OF REPORTS.

We have had quite a large call for our volumes of 1879 from abroad, and I have taken pains, as far as possible, to meet this demand with courtesy. It seemed to me that a leading object to be subserved in issuing these volumes by the State, was the advertisement of our horticultural prosperity and the peculiar advantages possessed by our State for the successful prosecution of this branch of industry. Hence, at no little trouble, and some expense to the society, I have sent several hundred volumes outside the State. Some of these have gone to other societies and educational institutions, but many of them have gone into the hands of people who were looking to Michigan for homes. In cases where it seemed to me men were taking advantage of our volumes to increase their general knowledge of horticulture, or to assist in their work in other States, I have asked the membership fee, or at least the expense attending the shipment of the volumes.

Our plan decided upon early in the year, by the executive board, was to be very careful to receive assurance that the volumes were wanted before placing them in the hands of the people, and the distribution was so arranged as to build up local societies, as far as possible, wherever the boxes were sent. This will be more fully explained under another head.

The details of the distribution have been under the management of Mr. F. W. King, our efficient librarian, whose annual report will explain what he has done. The plan of retaining in the hands of the society several hundred volumes of each year's transactions proves to be an excellent one, for every

year new-comers into our State, and others, who join the ranks of horticulture, desire to complete sets of our volumes as far as possible, and these are the very ones that most need the assistance which is rendered by the volumes.

FRUIT CATALOGUE.

Our fruit catalogue is praised everywhere, and applications for the annual report, on account of this portion of it, come from all parts of the Union. It is peculiarly serviceable to new-comers who contemplate setting orchards, and has a value scarcely to be estimated, when used by men that desire to plant extensively without having special knowledge of varieties as adapted to the vicinity in which they are to plant. Five hundred copies of the catalogue were issued, separate from the annual volume of transactions, and furnished at fifteen cents each to simply cover the cost of publication and mailing. These are not all yet used, but will probably be called for before the next issue. The work of compiling this catalogue and amending it from year to year is no small one, and thus far it has been accomplished almost entirely by President Lyon. It is a work worthy of the man, and as a legacy to the fruit-growers of Michigan cannot well be over-estimated.

OUR LIBRARY.

I wish to say but a word in connection with our library. We now have a safe place to put it and are receiving donations. Our only means as yet for increasing it is through exchanges and donations. We desire to gather a carefully selected list of books and publications that can be used for reference by any member of the society who may desire to thoroughly investigate any matter connected with horticulture. I can see illustrated in a small way in my own experience the benefits that may be conferred by such an aggregation of books. Although I have but few, still they are in constant use by those who are not so fortunate as I in possessing them. The enterprise of securing a large central library, under the care of our society, it seems to me, is one worthy of our careful attention.

Our present librarian, who began his labors last March, has put our little nucleus of a library in the best of shape, and his system of records is a most complete one. His report which follows this will thoroughly explain the condition of our library affairs.

THE QUARTERLY MEETINGS.

The quarterly meetings have been well attended, and admirably managed by the local committees in charge during the year 1880. The February meeting at Hillsdale was very largely attended from the immediate vicinity and from abroad. The arrangements for entertainment were different from any in our previous experience. The Hillsdale county agricultural society provided for all delegates at the hotels, and the accommodations for the sessions of the society were admirable. One feature of this meeting met with universal favor: The giving up of one evening to short addresses and social intercourse, interspersed with delightful vocal and instrumental music. There was some objection raised to this plan before its consummation, on the ground that it was a waste of time that should be given up to the discussion of horticultural questions. But all were pleased with the result of the evening's entertainment, and adverse criticism was hushed in the general good feeling engendered by the pleasant exercises.

The June meeting at Battle Creek was not so largely attended, but for so

busy a season there were a goodly number present. The exhibit of strawberries was the pride of this meeting. Our two new Michigan berries, the Marvin and Shirts, although shown under difficulties, having to be brought so far, compared favorably with any varieties on exhibition.

The September meeting was connected with the annual fair and will be spoken of elsewhere.

This annual meeting that we are now enjoying is spoken of by everybody as the best one ever enjoyed by the society. Three things connected with it I wish to especially mention: First, the generous hospitality tendered every delegate in attendance; second, the courtesy extended the society by Dr. Fricze, acting president of the university, in generously opening to us the doors of this institution and giving many of us our first opportunity of inspecting its various departments, and by so doing giving additional support to our already well-grounded pride in this noble head of our State educational system. Third, the exhibit of apples by our co-worker from Ontario, Canada, the venerable Charles Arnold. These varieties are the results of his personal endeavors in producing new and hardy sorts, by crossing, and exhibit the wonderfully varied forms that have resulted from seeds, the product of a single cross. His success in getting some really valuable new sorts commands our interest and admiration.

THE ANNUAL FAIR.

The annual fair held in Detroit September 13-17, was in some respects a more complete success than any we have ever held. The display of fruit was very choice, and there was not such a jam to encounter as on previous years. There was plenty of room to work and arrange the varieties so as to make the exhibit interesting, and there was none of the grumbling incident to a great rush of fruit for which there is inadequate accommodations.

Each member of our executive board had a department to look after, and was made chairman of the awarding committee in that department. The result was that the committee work was most satisfactorily and expeditiously accomplished. Several members of the awarding committees have written me since the fair, commenting favorably upon this arrangement. One said he had never done committee work where every entry was so easily found and where comparisons could be so carefully made. Still with these advantages, the exhibit was far from what we would like. The department of flowers was a jumble. There was no good place to show large plants, so that we had no valuable large plants shown. The ordinary line of florists' supplies was mixed, because our arrangements were so imperfect for this kind of an exhibit.

It was quite noticeable that notwithstanding Detroit has so many fine green-houses and so great a display of taste in the work of its amateurs, still there was little attempt to do anything at our fair.

One thing I might criticise, and that is the breaking over the rule in certain divisions where the fruit is required to be grown by the exhibitor. The premium list gives plenty of room for the collectors, without having them infringe on the rights of exhibitors who grow their own fruit, and I trust that at no future exhibit there will be cause for complaint.

There is certainly great advancement in two directions quite noticeable in our recent exhibits. First in the selection of varieties for an especial purpose; second, in the freedom from blemishes. It is getting to be known among pomologists abroad that the men who show fruit in Michigan know how to select specimens and how to name varieties.

OUR MEMBERSHIP.

Our annual membership the past year has been larger than for several previous years, and still it is far below what we have reason to expect. The dollar is very little to give by men who reap the benefits of the society's existence and have none of the work to do in its maintenance, and yet it is quite noticeable that in the list of members we find the men who are doing the work of the society while of those that reap the results and do nothing we have but a very few.

The life membership fund has secured quite an addition during the year; the report of the treasurer will give the exact figures. This fund is permanently invested and its income helps to pay bills that accrue in carrying on the work of the society. With the advent of better times I trust that this fund will grow very rapidly and eventually reach such an amount as will render the existence of the society a permanency.

FINANCES—RECORD OF DISBURSEMENTS.

As secretary of the society I draw all checks and hold in my possession the vouchers upon which the checks are drawn. In order to place the disbursements of the society in such shape as to be reviewed by every member, I have annually presented a classified summary of the bills paid during the year, and as no money is paid out without a check, this summary is the aggregate of all expenses between the dates named. The following statement is for the year ending December 1, 1880:

President's office.....	\$23 60
Secretary's office.....	23 40
Treasurer's office.....	1 69
Librarian's office.....	24 67
Secretary's salary.....	600 00
Printing.....	17 75
Advertising.....	10 40
Executive board.....	142 89
State fair.....	349 73
Fruit catalogue.....	99 00
Report, 1879.....	23 04
Report, 1880.....	4 10
Back reports and exchanges.....	17 22
Delegates abroad.....	29 40
Room in capitol.....	4 00
Local societies.....	36 45
Total disbursements for the year.....	<hr/> \$1,407 34

WORK OF THE EXECUTIVE BOARD.

The executive board have held six meetings during 1880 as follows:

Hillsdale, February 12.

Lansing, June 9.

Battle Creek, June 18.

Detroit, September 13.

Lansing, November 4.

Ann Arbor, December 7.

At each meeting during the year there has not only been a quorum present, but nearly every member.

At the Hillsdale meeting the premium list for the annual fair was discussed, amended, and submitted to the secretary to prepare for the printer; some new features adopted for the report of 1880; the business committee, consisting of Messrs. Chilson, Mann, and Guild, were chosen; the superintendents of the various departments of the fair selected; a resolution adopted authorizing the secretary to confer with the department of public instruction upon the embellishment of country school grounds; a series of articles of association adopted for use of branch societies; and the secretary instructed to go into the field and assist in organization of auxiliary societies. Aside from the above a resolution was adopted to offer premiums for most successful work accomplished in destroying the codling moth.

The plan of the premiums I can best explain by reproducing here the circular issued, with the suggestions of Prof. Cook which accompanied it:

To the fruit growers of Michigan:

At the winter meeting of the Michigan State Pomological Society the executive board decided to offer premiums for the most persistent and best-directed endeavors to combat the codling moth. Two premiums are now offered, a first of \$50, and a second of \$25, subject to the following provisions:

First, Societies, granges, municipalities, and neighborhoods can compete for the premiums.

Second, Notice of intention to compete for premiums must be filed with Secretary Chas. W. Garfield, at Grand Rapids, before June 10, 1880.

Third, The area covered, the number of trees protected, the number of larvæ or moths destroyed; the method used, the effort put forth, and the general success attained, will all be considerations in making the awards.

Fourth, A complete statement will be required of each competitor as to the work accomplished, manner of it, and information acquired, accompanied by an affidavit of its correctness, the same to be filed with the Secretary of the State Pomological Society on or before December 1, 1880.

Fifth, The executive board of the State Pomological Society will act as awarding committee, and the right is reserved to withhold all premiums in case the committee consider no effort worthy of a prize.

C. W. GARFIELD,
Secretary State Pomological Society.

The accompanying suggestions concerning the band method of combating the codling moth may be of use to any who desire to avail themselves of the above offer:

PREPARATION FOR BANDS.

The rough bark should be scraped from the trees before June 20. Old bird nests should be removed from beneath them.

KIND OF BANDS.

The bands should be either of woolen cloth or heavy paper—carpet-paper is best. Each band should be four inches wide, and long enough to reach around the tree with sufficient lap to be readily tacked.

HOW TO ADJUST.

First tack the band to the tree at one end, driving the tack to the head; then wind the band close about the tree till the other end laps over the tack already driven. This end is then secured by a second tack, which should not be driven quite to the head.

TIME TO ADJUST.

The bands should be in place by June 20. They need be put only on such trees as are in bearing.

AFTER MANAGEMENT.

About July 8 and every ten days thereafter till August 30, and again in November, the bands should be carefully unwound, after removing the outer tack, and *every one* of the "worms" or pupæ crushed. The worms are so large as to be easily seen, whether in cocoons or not, and none need be missed. After all are crushed the band should be again tacked.

A small tack-hammer, with a good claw, suspended about the neck, will be very convenient in this work.

WHO SHOULD DO IT.

As will be seen, this work comes just when the farmer and pomologist are most occupied. That every man of a neighborhood or community would attend to the work, is expecting too much, yet all suffer from each case of neglect. There must be concert of action. Why not, then, employ some trusty man or boy to give it his whole time, expressly stating in the contract that a single case of neglect subjects the employé to a forfeiture of all reward. The expense to each orchard of 100 trees will then be under \$3.00. Surely no one will complain of the expense.

Cellars where apples were stored should have wire gauze at the windows in May and June, that no moths may escape to the orchards.

What neighborhoods of Michigan will secure these generous prizes, and the still better prize of perfect apples?

A. J. COOK,

Entomologist State Pomological Society.

The Lansing meeting in June was given up to arranging for State fair, adjustment of financial matters, deciding upon methods of distributing reports, and a visit to the Agricultural College, in connection with the State Board of Agriculture and the Executive Committee of the State Agricultural Society, an account of which will be given by Mr. Satterlee at this meeting of the society in Ann Arbor.

The meeting in Battle Creek was given up to routine business connected with the strawberry festival.

The meeting in Detroit dealt with business connected with the work of the annual fair, adjustment of claims, etc.

The session in Lansing in November was to settle the discretionary premiums awarded by committees at the fair; to arrange for our annual meeting; and a committee was selected to look up matters of legislation connected with our horticulture, that may be desirable to present at the next session of the legislature. The committee were Messrs. Lyon, Gibson and Satterlee.

The meeting of the board here in Ann Arbor decided to hold the next session in Lansing; received the report of committee on legislation. The by-laws were so amended as to cover the following point: Any person paying one dollar to secretary of a branch society, by having his name and half of the fee transmitted to secretary of the State society, shall be entitled to an annual certificate of membership for the current year: *Provided*, The remaining half of the fee shall be used by the branch society in the furtherance of horticultural work in its locality.

President Lyon was selected a delegate to the annual meeting of the State agricultural society; and H. Dale Adams, Prof. W. J. Beal, and S. B. Mann were chosen delegates to the convention of Michigan agricultural societies.

The matter of choosing a vice-president for the Mississippi valley horticultural society was laid over until the February meeting.

FRUIT HISTORY OF MICHIGAN.

Every now and then since I have been secretary of this society, facts have been communicated to me connected with the early planting of trees and gar-

dens in Michigan, that have been interesting as contributing to the history of Michigan horticulture. It has seemed to me that if these could be all gathered and saved it would be a valuable permanent contribution to our transactions; and early in the year I presented a proposition to the executive board a plan for working up this matter, which, perhaps on account of its involving no expense and only a good deal of work on the part of the secretary, was adopted. I have been digging away at it during odd moments this year, and find it is a slow work. In a few counties I have found men who would undertake to gather the statistical information in their counties; but it takes a good deal of time in personal interviews (correspondence seems to avail little), and but few have the time or are willing to make the sacrifice that the facts may be gathered and saved. However, in the report for 1880 I have made a beginning, and through the aid of a few earnest men several counties have been carefully worked over, and the results embodied in contributions to our current volume.

I trust that during the coming year all who hear or read this report will assist me in carrying out this design. The men and women who know the history of the early efforts in horticulture are fast dropping away, and if we wish to save the history we must do it at once. I ask your aid in this matter. The simplest facts and circumstances are acceptable, and I do not care in what form they come.

BRANCH SOCIETIES.

I beg you to bear with me in a somewhat lengthy statement of the work during the past year in the organization of auxiliary societies. We have found that our best work for the horticulture of Michigan has been in the annual volumes of transactions. These have contained the results of our endeavors as the progressive steps have been taken, in a concise form to be used by all who desired to be benefited by them. The State some years ago passed a law by which an annual appropriation is made to defray the expense of printing a defined number of these volumes, for the use of the society in forwarding its work. The Society, on account of its straightened circumstances, has not been able to distribute the volumes according to the original intent, but has sent them out by thirties and fifties to any person who would take the trouble to distribute them to people who would receive them. As a result of this plan, often, when the volumes were all out for any one year, applications would be made by fruit men who needed the information, for volumes of the transactions and none were to be had. And all this time the Society was deriving no revenue from the volumes, so that really the appropriation, instead of being a benefit to the Society financially, was a detriment in that it created an expense to the society in the distribution of the volumes, giving nothing in return.

As a step away from this plan toward a better way, as he thought, the Secretary in 1879 sent out with each box a request that the person distributing the volumes should retain a list of the men, with their postoffice addresses, to whom the volumes were handed; this for the purpose of getting the Society in direct communication with the people who were supposed to take most interest in the work. As a result of this effort, for the 3400 volumes sent out there were less than 90 names returned. This was rather a startling announcement to make to the Executive Board, and the Board decided at once, that during 1880 there must be a different plan adopted.

After spending some time in discussing the matter, the board hit upon the

plan of organizing auxiliary societies in every county, city, or village in the State, in which may be found to exist sufficient horticultural or pomological interest to warrant a hope of their successful continuance. Such local auxiliaries to constitute the nuclei through which the membership of the parent society is to be kept up and increased, and the means through which an interest in and attendance upon its sessions shall be secured; as well as the medium through which the parent society shall collect and disseminate information, including, at least in part, the distribution of its transactions.

The idea was further suggested that the membership in the State and auxiliary societies might be combined and both covered by a single fee, with the offer of the current volume of transactions as an inducement thereto. It was further suggested that the transactions of the auxiliary societies should be transmitted to the Secretary of the State society, for insertion in his annual report.

The plan seemed to be very promising because it would place the State society in direct communication with every portion of the State where there was interest enough to form a society; and through the agency of the reports from these various organizations a proper estimate of the needs and capabilities of these localities could be made. At the same time the State society would, by placing its transactions almost exclusively in the hands of these societies, not only build them up but give to them the very latest and best horticultural knowledge to assist them in their progressive work.

The plan was adopted, and the secretary instructed to use what little surplus time he might have in pushing the new work.

In accordance with these instructions, I went into the field whenever opportunity offered, and as a result, we have branches organized as follows: Lansing, Ingham county; Jackson, Jackson county; Grand Rapids, Kent county; Ann Arbor, Washtenaw county; Allegan, Allegan county; Lawton, Van Buren county; Holland, Ottawa county; Woodland, Barry county; South Boston, Ionia county; Coldwater, Branch county; Benton Harbor, Berrien county; Ludington, Mason county, and Colon, St. Joseph county.

Aside from these, steps are taking for completing organizations in Hillsdale, Lenawee, Calhoun, Bay, Oceana, Muskegon, and Benzie counties.

Mr. S. L. Fuller, our former treasurer, the man who has done more to help the financial condition of our society than any other, in commenting upon this plan of auxiliary societies said: "It is a stroke of genius; it has better promises in it than anything that has been suggested; I am in for it and bid you God speed."

Whether we shall succeed in approximating our hope in this matter, depends upon a few people after all. In the beginning, every branch society must depend very largely upon the undivided efforts of a limited few; but as the plan develops, and the results become apparent, I feel that the burdens of our entire work will be more evenly shouldered by the men and women of the State, who believe in the grandeur of our possibilities in horticultural pursuits. The fact that in these auxiliary societies families can join in the support and benefits adds to the interest and hope in the success of the enterprise. At the close of 1881, we should have forty branches organized in the State. Whether we shall reach this estimate depends entirely on the cordiality with which the plan is received by our fruit-growers, tree-planters, and home lovers.

LEGISLATION.

Several matters have been brought to my attention during the year concerning legislation in the interests of horticulture, and I wish simply to call the attention of the society to one of them, that if thought best some action may be taken in connection therewith. We are getting to have a bad name in Michigan on account of our want of common honesty in the matter of fruit packages. It is impossible to tell from the appearance of a package how much is its capacity. Our half bushels are clipped short until they scarcely hold more than a peck; our pecks are shortened until we have all grades down to half-pecks, and the half-pecks often hold but three quarts, while the bottoms of the quarts are raised so near the top as to materially diminish the quantity of their contents. Some remedy should be used to protect buyers and honest growers, and it has been suggested to me that the State might by enactment require that the capacity of every package put upon the market be plainly stamped upon it.

A YELLOWS MATTER.

The question has arisen whether peaches from trees diseased with the yellows are injurious to the consumer, and in order to take steps toward the settlement of the question a basket of badly diseased peaches was sent by President Lyon to Dr. Kedzie, President of the State Board of Health, for investigation, and at Dr. Kedzie's request the following circular was sent out:

MICHIGAN STATE POMOLOGICAL SOCIETY, }
 Secretary's Office, Grand Rapids, Oct. 16, 1880. }

My Dear Sir:

President Kedzie of the State Board of Health is making a careful investigation of the question: Does the disease known as "yellows" affect peaches so as to make the fruit deleterious or poisonous when taken into the human system? If you know any facts concerning sickness caused by eating diseased peaches, please confer a favor by communicating them at once to Dr. R. C. Kedzie, Lansing, Michigan; or to me, and thus lend your aid to the investigation.

Yours truly,

CHAS. W. GARFIELD.

Very little testimony of any value has yet been sent in, but I hope members of the society will assist us in this investigation as far as they are able.

COURTESIES TO THE SECRETARY.

I cannot pass in review the work of the year without reference to some especial assistance I have received in connection therewith. It is well known to you all that we have little money to work with, and nearly all of that is earned in making the annual exhibit for the State Agricultural Society, hence in assisting the formation of local societies, and in the gathering of statistics, if traveling expenses amounted to much, my work would be sadly hedged in. But several of the railroads have come to my assistance, and granted me privileges which have enabled me to prosecute the work given in hand, as far as time permitted. The following railroads have granted me assistance: Chicago & West Michigan, through Mr. A. M. Nichols; Flint & Pere Marquette, through W. L. Webber; Grand Rapids & Indiana, through President Hughart; Lake Shore & Michigan Southern, through General Manager Newell, have all granted me passes, and the Michigan Central, through General Manager Ledyard, has granted me a half-fare ticket.

The columns of all our State newspapers have been open to all announcements and reports without expense to us, and several have taken especial pains to report the full proceedings of our meetings. Our society has now been in existence ten years, and its work has been accomplished very largely by men who have received little or no personal reward, and through their efforts the society has taken a creditable if not a commanding position among organizations of its kind, and when these efforts are so far appreciated as to be seconded by corporations which reap a goodly share of the resulting benefits, the workers are given heart to go on.

CONCLUSION.

In furnishing my annual statement, I must call your attention to the desirability of having a more even distribution of the burdens of the society. In the words of our friend, Mr. Emmons Buell of Kalamazoo, "When a man asks me for information in horticulture that has cost hundreds of dollars to secure, and I hand him a volume containing the desired intelligence, and ask him to take the valuable facts and leave a dollar for the society that publishes them, I want him to gratefully put his hand down in his pocket and hand out the dollar." There is a double result from money thus invested: it pays for good work, and interests the man who makes the investment in that work.

President Lyon read a short paper in the nature of suggestions to the society as he closed another year's service.

PRESIDENT LYON'S ADDRESS.

The close of the year seems to be a very proper time to take a retrospect of our doings, and to consider the workings of the various processes that have, from time to time, been put in operation; to devise plans for rendering them more effective in the future; and to consider, at the same time, whether or not our duty to the people of the State calls for further effort, in any new direction, for the advancement or development of the elevating and civilizing processes which we, as a society, are supposed to especially represent.

At our last annual meeting, in pursuance of a suggestion then submitted, the executive board were encouraged to devise and put in operation plans calculated to bring the society into more direct and intimate relation with the people of the State, by increasing its memberships, and distributing them more generally over the State.

The board, in considering this subject, soon came to learn that, while the whole number of volumes of our transactions issued by the State will only supply about one volume to three hundred of our entire population, and while hundreds of persons, who might desire to read and profit by them, are unable to obtain them, large numbers of them go into the hands of persons who fail to make any use of them; but either leave them idle upon their shelves, or commit them to the waste basket—a very unsatisfactory state of affairs, when we consider that the society is made the custodian of a large number of these volumes, and is therefore held responsible for a wise and careful distribution of them.

The fact had also long been obvious that while the *indiscriminate giving away* of these volumes had the effect to diminish their value in the estimation of the public, it at the same time operated directly to the diminution of

the society's membership, by rendering it practicable for most persons to retain their dollars; at the same time participating in its discussions, and securing its published transactions free.

Considering that it was the obvious intent of the Legislature, in providing for the issue of these volumes, to insure that they be so distributed as to best advance the object of their issue (an object clearly secured by distributing them only to persons interested in horticulture), the board at last fixed upon the plan of increasing the membership of the society through the organization of auxiliary societies, and constituting such societies its agents in such distribution, with their members as the first and preferred participants. It was clearly indispensable that such local societies should supply some evidence of their fitness for this work; and also some responsibility for its proper performance; while, at the same time, the State society should not assume the labor and expense of the preparation and distribution, and yet abandon all participation in the benefits to be derived therefrom. This it is hoped to secure by means of such auxiliary organizations.

At the last June meeting, at Battle Creek, the society, in pursuance of previous notice, adopted a revised and amended constitution, by the terms of which it assumed, in name, as it has for a long time done in practice, to be a horticultural society. This, it is assumed, is not expected to make it less a pomological society, than it has heretofore been; but it would seem proper to invite your consideration of the question, whether under the new designation, we may not properly take measures to invite coöperation, on the part of very many who may have felt themselves disassociated with us on account of the significance of our former title. By the terms of our by-laws now in force, we are warranted in so doing, whenever it shall be found wise or expedient. How far and in what manner this change should influence our arrangements, for and in connection with our various exhibitions, including their time, scope, and extent, would seem to call for much and careful consideration.

A similar care should be given to the question—how far the change should be allowed to affect the selection, and consideration of subjects for discussion; and it would seem wise to consider well whether under the new "regime" we cannot so arrange as to give more prominence to subjects of special interest to ladies, and, in so doing, increase their attendance at our meetings, and secure their more general coöperation with us.

Our very efficient secretary has heretofore taken measures to bring before the people of the State, and before the conservators of our schools, the importance of rendering the school buildings and grounds, where so much must be done towards moulding the tastes of those who are soon to be "the people," and from whom are to come our future rulers, as well as our horticulturists, more attractive, and better fitted to aid in moulding wisely and well. Michigan is justly proud of her schools and her school system; but we may well pause before we venture to add that she has reason to be proud of her school-houses—especially her country school-houses, and of the grounds that usually surround them. We ask the earnest and thoughtful attention of the society to the consideration of measures for improvement in this direction.

Michigan has come to be recognized as one of the leading States, if not even the leading State of the northwest, so far as the culture of fruit is concerned. That this prominence is justly accorded, we fully believe. Still we are convinced that her capabilities in this respect are but partially known or appreciated.

Thoughtful men, conscious how rapidly and wastefully our sheltering man-

tle of timber growth is being removed, and fearing calamitous results, especially to our climate, have long deprecated the almost entire lack of foresight in this respect, among both lumbermen and farmers.

The society has already made what was, of necessity, but a feeble preliminary effort to draw attention to this matter, by the offer of premiums for screens or wind-breaks, whether planted for such purpose, or reserved in the clearing up of farms. The society may well consider whether it may not properly invite the attention of the Legislature to the necessity of devising some plan by which such wastefulness, if it cannot be checked, may be so far limited or directed as to essentially modify or diminish the injurious results of such vandalism, at the same time asking for the collection and dissemination of such information respecting the real capacities of our soils and climate as shall still more strongly establish, abroad as well as at home, the status of the State in these particulars, involving, as they clearly do, most other possibilities of an agricultural character.

The society has now for several years, by an arrangement, renewed from year to year, with the State agricultural society, taken charge of the fruit and flower exhibitions of that society at its annual State fairs, making up its own premium list (under a limit by the agricultural society of the amount to be used for the purpose), and awarding the premiums. This arrangement, if continued for the ensuing year, must be renewed at the annual meeting of their executive committee, which usually occurs early in January. It will therefore be needful that the subject be considered by our executive board, at this meeting, and that arrangements be made accordingly.

Under present arrangements the society offers opportunities to exhibit fruits for comparison and identification, at the meeting in June, again at the State fair, in September, and at the two winter meetings. These suffice, very satisfactorily, for the autumn and winter fruits, and also for such summer fruits as chance to be in season at the June meeting, which is generally so held as best to meet the strawberry season. It is found impossible to so time this meeting as to properly meet the strawberry season, and, at the same time, accommodate any considerable variety of either cherries or raspberries. It is equally true that early plums, both very early and very late peaches, and many of the earliest apples and pears, are never seen upon our tables, in a condition adapted to give a proper idea of their character and real importance, while all possibility of exhibition as a means for the comparison and identification of varieties is, for the same reason, out of the question, so far as the fruits named are concerned. A consequence of this condition of things is, that very few persons have a proper knowledge of varieties of these fruits, and many spurious sorts are ignorantly planted and grown, and freely disseminated over the country, in fruit or in plant, or both.

It would seem to be very proper that the society consider what remedy, if any, can be devised for this condition of affairs. Our sister society, so long under the presidency of our esteemed friend Dr. Warder, has for many years kept in the field an "*ad interim* committee," charged with the duty of visiting points of interest, from time to time, with reference, as we suppose, to matters of this character. We invite your consideration of the question whether this or some other equivalent means cannot be devised, and made to meet and remedy the difficulty.

This short paper was followed by another given by Mr. Lyon as chairman of the committee on new fruits.

REPORT OF COMMITTEE ON NEW FRUITS.

The society, in providing for a standing committee on new fruits, only proceeded so far as to designate its chairman, leaving the filling up of such committee in the hands of the president. In the filling up of so important a standing committee, it seemed desirable to secure, not only experts, but also persons likely to interest themselves personally in the matter.

For the purpose of insuring such results as far as practicable, time was taken to confer with those to be selected, prior to such appointment. This resulted in the selection of G. H. La Fleur, of Allegan, Geo. C. McClatchee, of Ludington, C. Engle, of Paw Paw, and Dr. A. Conklin, of Manchester. It was thought important to add a member to represent the more easterly and northeasterly portions of the State, and the aid of the secretary was invoked for a selection; but, so far, no person has been found for the purpose, and that portion of the State stands yet without a representative upon the committee.

In the lack of any special committee for the purpose, it has been assumed to be within the province of this committee to take cognizance of such older fruits as may, from time to time, come to attract attention, with promise of future importance.

APPLES,

although in the highest sense the staple fruit of our State, have been represented, with the committee, by only a single new variety—a seedling, originating at Stevensville, Berrien county, in 1874, of which specimens were sent to the chairman by W. A. Brown, of that place. The fruit is rather small, beautifully colored, and of fine flavor, but since it is strictly an amateur variety, with no qualities calculated to give it position above several others of similar season, it was not thought best to advise the giving it a name and a place in the already too extended list of similar varieties, unless, upon further acquaintance, it shall be found to possess characteristics of value, not deducible from a mere examination of the fruit.

Wolverine

is a seedling apple named by Bates Fisher, of Quincy, Branch county, and received for description since the preparation of this report. It is an early winter fruit, of good size, rich color, and exceedingly agreeable flavor, but lacking juice, and, judging from the specimens received, inclined to be scabby and imperfect; besides which, the codling moth had appropriated nearly every specimen sent. From what we see of it, we cannot recommend it, as compared with several others of similar season. The best of the specimens received are on exhibition.

Hook Apple

is an old, New England, winter variety, not found in the books, nor even in the catalogues of the nurseries. We find a tree of it, kept and grown as an old favorite, on the grounds of Geo. Hannahs, of South Haven, Van Buren county. The fruit is of but medium size; yellow, with occasionally a red cheek, very tender, mild, rich, juicy—a fine dessert fruit; little if at all disseminated in this State.

Morris' Red

is an apple long grown about Adrian, Lenawee county, and by some known as Steele's Red. This was brought to the notice of the society last year, and a committee appointed, who have submitted a report, assigning it the above name.

Indiana Favorite

was exhibited at our last annual meeting by the delegate from the Indiana horticultural society. It had been in the collection of the chairman, where it developed qualities that gave promise of value for market. We commend it to the public as likely to be found desirable for that purpose.

Grimes' Golden,

although by no means a new apple, is very little known in Michigan. The little recent experience with it strongly indicates that it is worthy to be decidedly commended for market purposes, as well as for dessert.

Rebecca

is but little known in this State, but a trial of several years, in the orchard of the chairman, indicates that it is eminently desired as a variety for the home orchard; cions from Charles Downing, who traces its origin to the State of Delaware.

New England Beauty

is a sweet apple grown in the orchards of the chairman, upon cions from some source now unknown, which, for generally desirable qualities as a sweet apple, and for unusual beauty of appearance, seems to be eminently worthy of general dissemination. Fruit above medium size; color, yellow, striped and mottled with crimson. An excellent baking apple in season during September.

Hoyt Apple.

Specimens of a seedling apple, originating with James E. Hoyt, of Rockland, Ontonagon county, Michigan, reached me by express, after the Ann Arbor meeting, having been mis-addressed and delayed. The fruit had evidently been frosted, but was still in fair condition. Coming from the northerly portion of the Upper Peninsula, where we have been led to consider the success of this fruit as, to say the least, doubtful, we were surprised at its good qualities, not to say at *its existence at all*, and feel no hesitation in commending it to the attention of lovers of fruit in northern Michigan, as likely to be found hardy enough for that region, and a good dessert and cooking fruit. The tree failed to produce fruit until ten years of age, and was even then forced into bearing by placing a ligature around the trunk. This, although indicating tardy bearing, speaks well for its probable hardiness. The tree is a profuse bearer. Fruit rather below medium size, greenish yellow, with a brownish cheek, marbled or dappled with dark purplish red in the sun, flesh nearly white, firm, breaking, half-melting or buttery, juicy, vinous, sub-acid, sprightly, rich; named by Prof. Lawton, at whose suggestion the specimens were sent. As grown in that region it will doubtless keep till May or possibly later.

CHERRIES.

We received from Mr. Israel Pennington, of Mason, Lenawee county, specimens of a seedling cherry, originating with him, from pits planted about 1858; and by him said to be "hardy as an oak." The tree is of an upright habit, but less so than Black Tartarian, and is an enormous bearer. Fruit large, roundish, heart-shaped, dark red; flesh, pale yellowish white; sweet, vinous, rich, with the firm, breaking texture of the Bigarreau class, to which it belongs. It takes the name—Pennington's Bigarreau from the originator. It is said to be exempt from crackling and rot, and to be a better bearer than Bigarreau (yellow Spanish) and seems likely to prove valuable as a market cherry.

GRAPES

seem, at the present time to be attracting a large amount of attention among experimenters, although, in our State nothing new has reached a condition to be reported.

The seedling grapes of C. Engle, of Paw Paw, have been brought to the notice of the committee, and seem to promise something for the future, but we understand it to be his purpose to place nothing before the public till he shall have become thoroughly assured of its value—a determination which we most heartily commend.

We will therefore content ourselves with saying that Mr. Engle has not less than ninety seedling grapes, all, or nearly all, as we understand, being seedlings of Salem (Rogers No. 22), many of which have already borne, and several of which give high promise, both as to character of vine and quality of fruit. It is, however, a well known fact that it requires often several years of bearing to fully develop the quality of fruit and characteristics of the bunch of the grape. Mr. Engle will await such development, before putting his seedlings before the public.

Saginaw

is a seedling grape originating in Saginaw City a few years since, with Mr. G. Wingworth of that place. If we mistake not the fruit has heretofore been exhibited at the Michigan State Fair. We have no description of the fruit, but learn that the vine is vigorous and hardy, and that the season of ripening is early. We do not understand that it is yet offered for sale.

Moore's Early

was this year sent us, by the originator, Mr. John B. Moore, of Salem, Mass., when in season. Although originated several years ago it is doubtful if it has yet fruited in our State. We therefore merely take occasion to say that, from the specimens sent us, as well as from reports of its performances, where tested, we regard it as decidedly promising for locations demanding an early and hardy variety. The plates of this grape so frequently in our nursery catalogues, although they fairly express the form and character of the cluster, are an exaggeration of the size of the berry as sent us.

Hayes

is the name given by Mr. John B. Moore, of Salem, Mass., to a new white grape, of his production, originating at the same time with the preceding. Speci-

mens of this reached us on the 20th of September, but unfortunately in very bad condition on account of the crushing of the box in the mails. Enough, however, remained to enable us to describe it as a rather early, greenish white grape, berry of medium size, bunch rather long, open; flavor sweet, sprightly, excellent, flesh tender and very juicy; seeds few, small. The originator says, "Ripe ten days before the Concord."

Medlar

is a fruit rarely grown in Michigan, or indeed in America. It is grown to some extent in England, but its right to be considered indigenous, in that country, is considered doubtful. It is believed to have originated in Southern Europe, and Asia. With some doubts respecting its hardiness in this climate, we have imported, grown and fruited it for several years, and find it hardy, at least at the Lake Shore. It is, in habit, somewhat like the quince, although both plant and fruit are of small growth. The fruit is even more austere than the quince, and is applicable to similar uses. With the great variety of fruits at our command, it can only be regarded as a pomological curiosity.

PEACHES.

The past season, so prolific of fruits in general, has, as might be naturally inferred, brought out quite an assortment of new varieties. Especially is this true of peaches. This fruit has borne almost everywhere, and as a result an opportunity has been afforded to institute comparisons between the seedlings which have sprung up here and there, and the old and improved varieties. The opportunity thus afforded to all to institute critical comparisons before deciding upon the value of these varieties, has apparently operated as a preventative to the bringing out of the less desirable sorts, hence the fact seems to be that the candidates for public approval have, so far as we have opportunity to observe, been generally of high average quality. Among those that have come under our notice, the first to ripen was

Early Curtis,

which was received from Jacob Ganzhorn, Secretary of the Washtenaw County Pomological Society, fully ripe on the 23d of July. This is about the season of Alexander and Amsden this year, and this is in every respect, so far as we are able to judge, very much like them, except that it seems somewhat less inclined to adhere to the pit. We understand that there are two seedlings most alike in most respects. We have good reason to suspect them to be identical with two varieties brought to our notice two years previous by Mr. Gibson, of Clinton, Lenawee county, which we shall hope to fruit next season. The *Early Curtis* is crenate, with reniform glands.

Another early peach was sent us on July 27th, by Marvin & French, of Ovid, Clinton county, which was, in appearance, much like the *Early Curtis*, and, if we take into consideration the difference of latitude, likely to prove fully as early. The quality is also very similar. This purports to be a native of that locality—fruit of fully medium size, with the characteristics of Alexander and Amsden, including the tendency to adhere to the pit, and, as nearly as can be judged under the circumstances, of about the same season. Considering the present surfeit of very early peaches, we have not felt warranted to encourage the originators to name or introduce this till after careful comparison with those in competition with it.

An Apparent Seedling of Late Crawford

was received from L. D. Lockwood, of Clyde, Oakland county, September 27th. Specimens of it had been (if we mistake not), exhibited at the State Fair at Detroit. The specimens were over-ripe and partially decayed, appearing very much like Late Crawford in form and color, and apparently differing little from it in quality. It was said to be ripe this season September 1st, and hence may prove to be earlier than that old popular favorite, which it may possibly excel in flavor and beauty of color. We regard it as worthy of trial.

The Husted Seedlings,

noticed last year, have been again sent us, and seem to maintain their reputation of last season. Numbers 15, 16 and 17 were sent us August 11th, this year, and were then in fair shipping condition. They seem adapted to fill the hiatus of yellow peaches between Hale's Early and Early Crawford. Numbers 20, 22, 26 and 46, which we examined last year, were not sent this year.

Mr. C. Engle's Seedlings

were examined upon the trees, except the President Lyon—a seedling of Early Crawford, planted in 1870, and which has now fruited six years. We describe it from specimens sent us August 14th, 1880, which were then just in condition for shipment. The tree is hardy, vigorous, and very productive, with large, strong, dense foliage and reniform glands. Fruit one-fourth larger than Early Crawford, and otherwise much like it. Mr. Engle says it is the showiest peach he grows. Quality fully equal to its parent.

Michigan

is also one of Mr. Engle's seedlings, from Late Crawford. It originated from a pit planted in 1875, and first fruited in 1879. Tree very hardy, vigorous, upright, spreading, and promises to be an excellent bearer. Foliage long, broad, crenate, globose, glaucous. Fruit very large, round, compressed, one side slightly enlarged. Color yellow, nearly covered with dark red. Pubescence medium. Flesh bright yellow, slightly yellow at the pit, fine grained, juicy, with a rich, pleasant and highly vinous flavor. Adapted to either dessert or cooking. A promising market peach. Ripe a few days before Late Crawford.

Eliza,

another of Mr. Engle's seedlings from Late Crawford, originated also in 1875 and fruited first in 1879. Tree very much like the foregoing, but a little more upright, with the same glaucous peculiarity of the foliage. Fruit rather large, roundish, slightly tapered to the apex. Color yellow with bright and dark red. Pubescence more than medium. Flesh bright yellow, red at pit. Texture tender, delicate, moderately juicy, with a mild, rich, vinous flavor. Uses, dessert, cooking and market. In season after late Crawford, and, in the originator's opinion, the finest flavored of the set.

In examining and describing this peach when at Mr. Engle's place, the fact escaped our recollection that we already have a peach named Eliza, and an examination of its description in Downing's latest revised work (pages 611 and 612), will show that the two are, in most particulars, very much alike. We therefore suggest to Mr. Engle, before sending out his seedling, to so modify its name as to avoid any difficulty in the identification of the two.

Josephine

is another of these Late Crawford seedlings by Mr. Engle; originated in 1875 and first fruited in 1879. Tree very hardy, vigorous, upright, stout. Foliage crenate, globose, glaucous, waved. Fruit very large, round, greenish yellow and dark red. Apex, a swollen point in suture. Bloom rather slight. Flesh pale yellow, slightly red at the pit; tender, melting, juicy; mild, rich, vinous flavor. A market peach. This variety has a few dark brown spots, similar to those on Hill's Chili. Season same as the foregoing.

Juno

is the last and latest of this set of seedlings, originating, like the two preceding ones, in 1875, and first fruiting in 1879. Tree hardy, very vigorous, very upright and bears heavily. Foliage long, broad, smooth, glaucous, waved, crenate, globose. Fruit very large, round, compressed, yellow, dark red in the sun, apex depressed with the suture, pubescence medium. Flesh very bright yellow, slightly red at the pit, which is adherent; fine grained, very juicy, vinous, rich. A market, cooking fruit. Ripe October 1st, with the Heath Cling. An exceedingly promising late cling.

Another Late Crawford Seedling,

the result of a second reproduction from that variety, was introduced to our notice by specimens received from George Busk, of Battle Creek. A seed produced from a seedling of Late Crawford was planted in 1875, and is understood to have first fruited this season. The tree is small, for a four-years-old. Fruit large ($9\frac{3}{4}$ inches in circumference), round; color yellow, with a little red; pubescence moderate; flesh, bright yellow, juicy, vinous, good. Uses, cooking, market. Free stone. Ripens this year, September 5th to 10th. It seems to be a mere reproduction of the Late Crawford; possibly earlier. The specimens were partially decayed when received, hence farther acquaintance is needed to determine its characteristics and consequent value.

Kelsey Cling

is the name given by us, at the request of the introducer, to a peach originating at Three Rivers, Michigan, and brought to our notice by Mr. Stephen Kelsey, of that place. The original tree (probably a budded one) died, leaving four sprouts from the roots which bore a few fruits in 1875, and a full crop this year. We describe it as follows. Tree vigorous, foliage crimped, recurved, crenate, reniform. Fruit medium sized, roundish; color pale, creamy white, with red, marbled cheek. Apex, a swollen point in the suture; pubescence very slight. Flesh creamy white, red at the pit; melting and delicate, but firm; juice very abundant, flavor very mild, rich and pleasant. Uses, culinary and dessert. The specimens were sent by Mr. Kelsey to Secretary Garfield at Grand Rapids, and by him to me at South Haven, reaching me on the 16th of October, still in good condition. They will probably be in season with Heath Cling. It is somewhat doubtful if they can be relied on, except in Southern Michigan. The specimens are said to have grown with the tree standing in sod, and without cultivation. The size, and possibly even the quality, might be improved by cultivation. At the South we regard it as eminently worthy of trial.

To the foregoing we add the following description of three peaches, brought

to the notice of G. H. La Fleur, of Allegan county, a member of this committee:

Stranahan's Late Orange.

Tree a seedling, two years old last spring, vigorous and an early bearer. Foliage of medium size, rather long, grayish green, slightly crimped, glands reniform. Fruit very large, nearly round, deep yellow with a red cheek. Flesh firm, golden yellow. Quality good, free stone, ripens immediately after Smock Free. The tree bore ten peaches this year, as large and as fine in appearance as I ever saw. I consider it a great acquisition on account of its size, color, and season of ripening; market value, 10; dessert, 7. The tree was grown on the farm of Mr. Stranahan, in the town of Monterey, Allegan county. Mr. Stranahan wishes it named Stranahan's Late Orange. For the sake of brevity we have suggested to Mr. Stranahan that it be called simply Stranahan, or at the most, Stranahan's Late.

McCormick.

I have found a peach tree upon the farm of Wm. H. McCormick, of the town of Clyde, Allegan county, which to me is new. The tree is similar in appearance to Late Crawford, excepting that the leaf is somewhat larger and deeper green, with reniform glands. Fruit nearly round, yellow with red cheek. Flesh deep yellow to the pit, which is small; freestone; somewhat larger than Late Crawford, and ripening a few days earlier. Market value, 10, dessert, 7. I call it "McCormick," by way of distinction, and have sent it out under that name. Mr. McCormick thinks it the best market peach of its season.

Granger

is a seedling grown by S. L. Staley, and by him transferred to F. Granger, of Monterey, Allegan county. The tree is now about thirty years old, has withstood the cold seasons remarkably well. Fruit fully large as Late Crawford, ripening a few days later, yellow, with red cheek, free stone. Comes in between the Late Crawford and Smock Free. Leaves large, crimped; glands globose. Market value, 10; dessert, 8. From the name of the present owner of the original tree, it is designated as "Granger" peach.

"I have three more varieties, all seedlings, which I wish to prove more thoroughly. I consider them fully as valuable as the foregoing; will report upon them next season. All are large yellow peaches, ripening somewhat earlier than the three already described.

G. H. LAFLEUR."

In examining these descriptions, it may be observed that three of Mr. Engle's seedlings, and also the three above described by Mr. La Fleur, seem to closely resemble Crawford's Late in many if not most respects; which, with three others of similar character, promised by Mr. La Fleur for next year, make nine rivals of that favorite old variety just entering the field. This would seem to indicate the need of great caution in the putting forth of these new varieties.

Aside from the new varieties already named, a very considerable number of others heretofore, so far as we are informed, untried in this State, have this season shown fruit, mostly for the first time. Among these we name:

Moore's Favorite,

which, although by no means new, seems to be unknown here. Among our

popular varieties we have very few to equal it, either in high quality, or beauty of color. It is a pale-fleshed free-stone.

Cooper's Mammoth

is one of those fickle titles which seem to apply to almost anything upon occasion, and which belong in fact to nothing. Applied a few years since to Early Crawford, we now find it doing duty as the cognomen of an unknown, serrate, yellow peach, found upon the premises of A. S. Dyckman, of South Haven, formerly president of this society. This peach, although large and good, is probably worthless on account of the unproductiveness of the tree. The name is, of course, a misnomer.

Pullen's Seedling,

a yellow, late September peach, which originated thirty years ago in New Jersey, promises to be valuable as a market variety. It is somewhat known in the vicinity of Saugatuck.

Susquehanna,

a favorite late peach of Eastern Pennsylvania, has fruited with us for two years past, and is attracting much attention on account of the large size and fine quality of the fruit, as well as its maturity at a desirable season. The question of its productiveness can hardly yet be said to be settled. It is unproductive at the east.

Ruding's Late Red

gives indications of value, mainly as a beautiful, rich and excellent, pale-fleshed, desert peach, for the latter part of September.

Yellow Oblong

was received from Eastern Pennsylvania, among trees imported for sale. The appearance of the fruit and the lateness of its maturity (end of Sept.) indicate possible value as a market variety.

Lady Palmerston

is also a late yellow peach, originated by the late Thomas Rivers of England, the originator of several popular new sorts. The first fruiting of this would encourage the idea that it may be able to vindicate for itself a high position, even as a market variety.

Wilkins' Cling.

A tree received under this name has now fruited. Notes taken at maturity pronounce it one of the most beautiful of peaches. This name is, however, a new one to Pomology. We suspect it to be Heath Cling. Another season is needed to decide the question.

Atlanta

has now fruited here two years. It seems certain to assume a prominent position as an amateur, and possibly even as a market variety.

Variegated Free.

We have watched this variety with much interest, particularly on account of

the name. Its first fruit, this year, is unexpectedly fine. Indeed, it is so unusual for so excellent and beautiful a fruit to be circulating about unrecognized and even unnoticed, that we more than half suspect it to be an estray. Whatever be its true name, it is good and beautiful enough to satisfy the requirements of the most fastidious. Season, the latter half of September; glands globose; a pale-fleshed free-stone.

Muscogee

is an unattractive looking, late September peach, originating in Georgia, which disappoints us by its unexpectedly excellent quality. Forbidding as one looks, it is a really fine flavored dessert peach; a pale-fleshed free-stone.

Reeves' Late Yellow

is a very late, yellow, free-stone, market peach, of eastern origin, similar in general character to Early Crawford, fully as beautiful and even more desirable, if sure to ripen in all seasons.

Silver Medal

is understood to be a recent Missouri variety, ripening at the end of September or beginning of October. White, with a faint, red cheek, with flesh white and free from all discoloration at the pit. It will, beyond doubt, prove one of the most desirable culinary peaches, on account of this absence of all color in the flesh; the only doubt being as to our ability to ripen it with certainty in our climate.

Gugeon's Late

is an early October, pale-fleshed, market peach, which comes to us from Central and Southern Ohio, and is represented as valued among growers there. It has been satisfactory here, in our recent favorable seasons; but it remains to be determined whether or not it will be sure to ripen under less favorable circumstances.

PLUMS.

Imperial Blue

is a plum introduced into our State catalogue from Lenawee county, upon the representation of Israel Pennington, of Macon, a prominent fruit culturist, but heretofore without a proper description. This is now supplied by means of specimens sent us when in season by Mr. P. From these specimens we describe it as rather under medium size, nearly round, purplish black, with a dense bluish bloom; stem short, in a shallow, regular cavity; flesh greenish yellow, soft, delicate, juicy, rich, sweet; pit small, oval, roundish; season, September 1st to 10th. It is understood to be a good keeper and exempt from rot.

RASPBERRIES.

Cuthbert

has for some months past attracted much attention as the coming market red raspberry. Experience with it in our State cannot, of course, have yet been very extensive, but so far it would seem to be favorable. J. D. Baldwin, of Ann Arbor, has doubtless been as thoroughly acquainted with it as any other

person, and so far as we have understood, his impressions respecting its desirability are favorable. It seems to be quite hardy, of fine size, firm texture and rich color. Queen of the market is considered as identical with it.

Montclair

is a recent seedling of Mr. E. Williams, of Montclair, New Jersey. We think it is not yet in the market, but plants sent us for trial have now fruited two seasons, and prove to be of fine size, great firmness of texture and excellent quality, qualities essential to a good market berry. It proves abundantly hardy at the lake shore. It purports to be a seedling of the Philadelphia, and like its supposed parent, produces suckers but sparingly.

Gregg

was heralded with so great a flourish of trumpets that there seemed occasion to fear that it might fail to realize all that we might be lead to expect of it. It seems now clear, however, that it is really a step in advance of the old and popular Mammoth Cluster, at least so far as size is concerned, while it is at least its equal in quality and productiveness. It seems pretty sure to become, among black caps, the leading market variety, although we already hear of varieties with the ability to outdo and supersede it.

STRAWBERRIES.

No new novelties have this year been brought to the notice of the committee, and we hear of no new varieties claiming origin in our State.

The Windsor Chief,

which was shown at our June meeting two years since, seems on all hands to have won the reputation of being the Champion—and only the Champion. It was supposed that such a charge, so frequently reiterated, would doubtless win from its alleged originator a defense, or at least an explanation, but as nothing of this kind seems to have appeared, the result must naturally be to increase the suspicion that such defense is impossible—in other words, that the Windsor Chief is but a myth.

The Glendale, Marvin, Seneca Queen, Sharpless and Shirts,

each in its sphere, seems to be winning a good reputation among fanciers of this fruit, and it is believed that at least some of them will come to hold leading positions.

We consider as still on trial with more or less promise of value: Belle, Burgess, Cumberland Triumph, Forest Rose, Fowler's Seedling, General Sherman, Hervey Davis, Iowa Prolific, Miner's Great Prolific, New Jersey Scarlet, Pioneer, President Lincoln, Russell's Advance, Springdale and others.

Burr Oak, Caroline, Centennial Favorite, Continental, Photo, Starr, Seedling Eliza, Wilding Seedling, Walden, and a number of others, may be regarded as beyond hope of usefulness, except in isolated or peculiar cases.

Star of the West and Sterling, although possessing desirable qualities, must be condemned as persistently unproductive.

T. T. LYON, *Chairman.*

ELECTION OF OFFICERS.

The committee on nominations reported, and the election resulted in the selection of officers named in one of the first pages in this volume.

The hour for intermission having arrived, a recess was taken until 2 o'clock.

Wednesday Afternoon Session.

After the usual opening with music, Mrs. Pierce read a very pleasant, brief paper entitled "Reciprocity." It was listened to with interested attention, but is not reproduced here because outside the line of horticulture.

Prof. Harrington, of the State University, followed with an address, illustrated by crayon drawings on the blackboard, upon

THE WINDS OF MICHIGAN.

The object of my remarks will be to point out the general characters of the different sorts of winds of the region of the upper lakes. While many of the special conclusions reached are the results of a study of the winds of Ann Arbor, they will undoubtedly generally apply to the whole of Michigan and to much of the neighboring States.

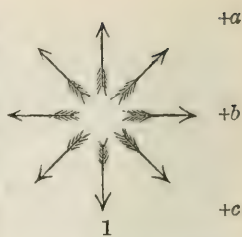
A clearer conception of air-currents can be got by remembering that we are at the bottom of an ocean of air, which differs from the ocean of water, among other things, in its greater mobility, in not having the bounds set to it which banks and coasts set to rivers and oceans, and in growing rapidly rarer as we ascend. All these features are favorable to the development of direct currents or whirlpools, and the same originating cause would produce greater motion in air than in water.

The conception of the winds is still farther simplified if we imagine them moving in sets or systems, the whole set having an independent progressive motion. A dust-whirlwind is a system of winds. The whole set of winds may remain stationary as a system or may have a progressive motion. If the latter, and we stand in its path, the wind which strikes us may be first north and then south, while the whirlwind as a whole may come from the east. The direction from which the system of winds comes does not necessarily indicate the direction of the currents forming the system.

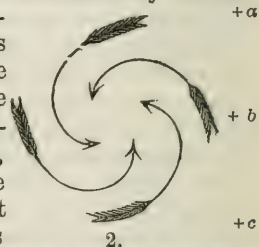
There are three different systems of winds known, the parallel, the centrifugal and the centripetal. In the *parallel* system the currents which make it up move parallel to each other, and the whole may be called a river of air. In this case the direction of the current which reaches us indicates the direction from which the system comes. Very few of our winds belong to this class. It is illustrated by the straight zephyrs of summer, and also by the trade and anti-trade winds. When the parallel winds are of little extent they are straight-lined, but when they pass over a considerable part of the distance between equator and poles, the rotation of the earth bends them. Thus the trade wind bends in its course from north to nearly east and the anti-trade from south to nearly west.

In the *centrifugal* system, the wind pours out in all directions from a centre,

represented by the direction of the arrows in the diagram (1). If this system has a progressive motion the place over which it passes has a succession of winds from different directions. If the direction is east, a point in the path of the centre, as (*b*) in the diagram, will have first a west, then an east wind; a point to the north of the path of the centre, (*a*) of the diagram, will have first a southwest, then a south, then a south-east wind; and a point to the south of the path of the centre (*c*), will have a wind which begins at the northwest and swings through north to northeast. By varying the direction of the system and the position of the point passed over, we may get any succession of from two to five of the eight principal directions.



In the *centripetal* system we have a whirlwind of greater or less dimensions. It has often been suspected that, in some cases, at least, the currents here flow directly in toward the center, but no positively convincing case has been published so far as known to the writer. In every case satisfactorily investigated the wind flows in toward the center in a spiral something, as shown in diagram (2). As this system passes over a place there is also a succession of winds, but the order in which they follow is different from that of the centrifugal system. If in this case the progressive motion is east, and a point (*b*) lies in the path of the center, its winds are first south, then north. If it lies to the north of the center, as (*a*), the wind is first southeast and swings through east to northeast; if the place is south of the center, as (*c*), the wind begins at southwest and swings through west to northwest. Similar successions may be found for the other progressive directions and positions of the path of the center.



We shall now classify the winds of Michigan as to their origin and range. From this point of view they fall naturally into local, cyclonic, and general. The local winds are of local origin, and limited range. The origin of the cyclonic winds is not known, but they undoubtedly originate in conditions which prevail at the same time over an extensive region, but are not general. In range they pass sometimes nearly around the earth, but they exercise no influence on the winds outside of their system. The general winds are part of the interchange of air between equator and poles and are due to the greater heat at the equator.

I. LOCAL WINDS.

a—Zephyrs. These are light winds of local origin and very small extent. The region controlled by them at any given time may be a few rods or possibly a few miles square. They are of brief duration, and the zephyr which dies out now may be immediately replaced by a breeze from a different direction. Zephyrs are parallel or centripetal and possibly sometimes centrifugal.

b—Ascending vertical currents. They would not be felt by us at the earth's surface, as that is the place of origin. They are due to the unequal heating of the air near the ground. The warmer air is lighter and ascends, but we see nothing of it until its altitude is so great that the cold of the upper regions condenses its vapor in the form of white mountainous clouds called cumuli. These winds occur in summer and are doubtless in a parallel system.

c—Squalls. On the 19th of August, 1880, at 11 o'clock in the forenoon, a remarkable cloud was seen advancing on Ann Arbor from the west. Its advancing edge had clear-cut, bluish, longitudinal folds, reminding one of folds of calico. The wind was then southwest and running at four miles per hour. At seven minutes past eleven the cloud came over us and we could see ragged edges hanging from its under surface. At the same instant the wind rose to a velocity of 15 miles per hour and at 11:17 was as high as 50 miles per hour. Meantime the barometer rose from 28.98 to 29.02 and a few drops of rain fell, at 11:23 the rain began to pour down in torrents and continued to do so for 12 minutes. The thunder had been heard before but the lightning now became vivid, and the cracking of the electric discharge was frequent among the electric recording instruments. In this interval the barometer reached its highest point, 29.05, and stood there steadily, and the wind was running at the rate of 30 miles per hour; at 11:35 the rain ceased, the barometer dropped rapidly and the wind fell. During the storm the wind turned to west and northwest in which direction it remained after the storm passed.

Here we have an illustration of the squall. In this case it was a thunder-storm, but lightning is not a necessary accompaniment of a squall. This storm was a local center of high pressure from which the wind poured out in all directions. The storm-center passed northeast and we lay to the south of the path of its center. An examination of the diagram for centrifugal winds (1) will show that our succession of winds should have been southwest, west, northwest, which was the succession actually observed.

Of such squalls Ann Arbor had 15 or 20 during 1880. Their characteristic features are a rapidly advancing, irregular cloud, accompanied by an independent system of winds having no observable relation to the winds blowing previous or subsequent to the storm. They usually reach us from some western direction, last from 10 minutes to an hour, and are usually accompanied by rain or hail and lightning. They are most common in the hottest months and the hottest part of the day.

Some of these storms are very probably centripetal, and it is believed by many that the same storm is at first centrifugal, then centripetal, but the speaker has observed nothing to support either theory.

d—Tornadoes. The violence of the tornado is very well known. The usual history is as follows: A funnel-shaped spout forms and extends downward from a mass of clouds. It is of a dark color, spirally striped and sometimes shines with an electric light. Such spouts have been seen to form in the air and extend downward without reaching the earth, and no bad effects have followed from them. Where, however, they have reached the surface they have been found to be accompanied by a system of centripetal winds of extreme velocity and destructiveness. Few structures can stand before them, and the point of the funnel in contact with the earth sweeps a clean path as it goes. It does not always remain in contact with the earth, but sometimes steps over a considerable space. Their progressive motion is nearly east, and their path usually a few rods wide and as many miles long. Tornadoes are most common from Dakota to Texas eastward to Ohio, but they have been known in all the States and territories east of the Rocky Mountains, except perhaps in Florida. Michigan usually escapes, but she has had a severe one in 1880 near Battle Creek, another very destructive one in Port Huron, a few years ago, and another celebrated one at Sault de Ste. Marie. Although they are local storms the conditions producing them may extend over a large area, so that we may hear of several tornadoes in different States within a few hours

of each other. They are also apt to recur in the same locality. They are most frequent in the hottest part of the year and of the day.

That the tornado is a small centripetal storm is indicated by several facts. Trees and other objects are thrown down in the directions indicated by the arrows in diagram (2.) At the outer edges of the path their trunks are parallel to the path, in the center they lie across the path. Light objects are frequently seen to be taken up into the air and to whirl upwards in a spiral direction.

The preceding are the local winds observed in Michigan. In the prediction of them the science of meteorology cannot help us at present. The meteorological stations are too scattered to be of use in the study of so local phenomena. A tornado may form in the center of Michigan, travel many miles, and do great damage without there being any indication of its presence in the instruments of the observers at Detroit, Port Huron, Grand Haven or Chicago. Were we able to multiply observers until we could have several in each county, we might detect severe local storms in their formation and forewarn those endangered by them. It is at least an experiment well worth undertaking.

II. CYCLONIC WINDS.

The cyclone is a storm-area with a centripetal system of winds of large dimensions. In the weather reports it is usually referred to as an area of low pressure, and it has been found that the centripetal winds pour in toward such areas. Each cyclone is accompanied at a distance by one or more anti-cyclones or areas of high pressure.

e—Cyclones. The winds of the temperate zone have long been described as variable, and it is only recently that it has been found that their variability is subject to a definite law and their changes can be predicted for a day or two in advance. A cyclone can be most easily conceived of as a large and mild tornado. It is an area of low pressure, usually oval in form, with its long diameter nearly north and south, and is surrounded by concentric gradients of successively higher pressure. The existence of such dishes of low pressure is sufficiently interesting, but the value of the knowledge of them becomes greatly enhanced when we know that they come to us from the west and travel from us toward the east in tolerably uniform paths and at a velocity on the average of 30 miles per hour, and that they carry with them definite conditions of wind and weather. They usually come from the Pacific or the northwest, travel eastward on a curved path convex toward the southwest and disappear over the mouth of the St. Lawrence. They are storm-areas and are accompanied by clouds and a higher temperature.

But the feature of interest here is the centripetal system of winds which accompanies the cyclone. It is like that of the tornado, but while the tornado system of winds turns indifferently with or against the hands of a watch, that of the cyclone in the north temperate zone turns in a direction opposed to that of the hands of a watch. It also differs from the tornado in its dimensions. The former controls the wind only for a few rods on each side, while the latter reaches out hundreds of miles from its center. While this storm-center is in Iowa or Nebraska or at Quebec or near James' Bay the winds of Michigan may still be controlled by it. The paths of the centers of the cyclones usually lie south of Michigan in summer and over northern Michigan in winter. For south Michigan we will therefore have, in summer, winds beginning at southeast and passing through the east to the northeast; in winter beginning at southwest and passing through west to northwest.

f—Anti-cyclone. It is the reverse of the cyclone. It is an area of high pressure, with centrifugal winds, and brings clearer and cooler weather. From the anti-cyclones we receive many of our cold gales. They are more inclined to remain stationary than the cyclones, and when they stand over the plains of the west there is nothing to intercept their winds from us and we may have one or more days of cold, high winds which blow steadily from some point between northwest and southwest. When they pass us as they travel eastward, the succession of winds is like that given by diagram (1).

III. GENERAL WINDS.

g—The trade-wind frequently prevails in the Atlantic states, but seldom reaches Michigan. When it does so it is a light and cold wind from north to northeast, continuing several days and accompanied by a moderately high and steady pressure. It has been observed by the writer only in the winter.

h—The anti-trades pass over the tropics at a considerable elevation, and begin to be deflected to the surface at about our latitude. Doubtless the well-known predominance with us of westerly winds is due to these in part, but the cyclones and anti-cyclones must furnish the greater part of these winds, and it is not easy to distinguish the latter from the anti-trades. The anti-trades should be cold because they come from a cold region of the atmosphere, and they should usually be accompanied by clouds caused by their cooling of the air into which they penetrate.

Following Prof. Harrington, Mrs. McReynolds addressed the convention upon the subject of "the Origin and Advantages of Association." The paper was an exhaustive treatise upon the topic, but as it does not pertain to the especial objects of our society work is not published in these transactions.

Mr. James Satterlee of Greenville, as member of a committee to visit the Agricultural College, in connection with the executive committee of the State Agricultural Society, and in acceptance of an invitation from the State Board of Agriculture, read the following paper as a report, to which we give the title:

OUR TRIP TO THE AGRICULTURAL COLLEGE.

The 10th of June, 1880, will always be a red-letter day in the memories of the members of the executive committee of the Michigan State Horticultural Society. An invitation to visit the college had been extended by the State Board of Agriculture to this committee, to the executive committee of the State Agricultural Society, and that of the State Grange. The invitation was cheerfully accepted, and early on the morning of the 10th the various committees found themselves on their way from the capital city to the college. The three miles were quickly passed. The season of the year was most delightful. Nature had donned her freshest garb. The emerald hues of the forests seemed to vie with those of the well tilled fields and orchards on either side to gladden our eyes and fill our souls with delight as we passed along. The first entrance to the college grounds is by the side of the Red Cedar River, where it leaves the grounds on its way to join the Grand River a few miles below.

As we went up from this entrance along the north bank of the river on to the high ground near the president's house, a scene of rare beauty was presented. We seem to be looking out upon and across a natural park, with here and

there a tasty cottage or stately hall half hidden by the trees, and with broad stretches of velvety lawn intervening. At our immediate right flows the Red Cedar River. We can trace its course as it enters the farm far to the eastward, flows on through the farm itself, and then forms the southern boundary of the ornamental grounds, where it is fringed with trees of many kinds.

In front of us and a little to the left are the professors' houses, beginning with that of President Abbot. These are surrounded with trees and well kept lawns. Farther on in the same direction, and bordering upon the Grand River turnpike are the fruit and vegetable gardens and the apple orchard. Immediately at our left is the sample orchard of pear, plum and cherry trees. Between the professors' houses and the turnpike on the north are gardens containing the experimental plats of seedling strawberries, raspberries, gooseberries, currants, and grapes, the vineyard and also the arboretum and nursery. Directly in front of us and in the distance stands College Hall containing the museum, library, chapel, recitation rooms, etc. Beyond this at a little distance is Williams Hall for students, and a little further on are the farm-house and other farm buildings. At the right of College Hall and near the bank of the Red Cedar stands Wells Hall for students. A little nearer to us is the greenhouse, and still nearer, and separated from the greenhouse by the little stream that flows through the grounds, is the new botanical laboratory and museum. Between the greenhouse and College Hall is the chemical laboratory. East of the farm buildings and south, extending across the river, lie the well tilled and productive fields of the farm.

As we passed on down the main drive past the professors' houses and brought up in front of College Hall, we were warmly greeted by the members of the State Board of Agriculture and professors. As soon as the hand-shaking was over we proceeded at once to business. Our committee, being interested in horticulture, spent most of its time in looking over the gardens and orchards, giving but a hasty glance at many things of interest. A day is all too short a time to examine the work of the college in the horticultural department. But we did what we could in the little time we had under the efficient guidance of Professor Beal and Frank A. Gully of this department.

The limits of this paper will only allow me to give a sort of general outline of the plan of work, and to touch upon some of the things that interested us. In the basement of College Hall we found the foreman's office, and the tool-room for the garden department. The smaller tools are kept here, all numbered and each in its proper place; the larger tools, wagons, plows, etc., are kept in a tool-house adjoining the barn belonging to this department. At the office the students are assigned their work for the afternoon, and proceed with those having charge of the different divisions. Usually a member of the senior class has charge of the drives, another of the nursery, another of the orchard, another of the evergreens, and so on. These are under the supervision of the foreman, and the general plan of work and experiments is in charge of Professor Beal, who spends, besides two or three hours in the forenoon in teaching classes, all the afternoon looking after various details of the experimental work, and in giving practical instruction to squads of students of about eight each. This practical instruction includes such work as pruning grape-vines and fruit trees, grafting, budding, layering, transplanting, crossing, and many other processes taught in books, and by the professor in class, but not really understood until the work is actually performed by the student himself. This kind of work is not paid for, and is something of an innovation upon the ordinary labor system pursued at the college. It seems to work well

so far, is enjoyed by the students, and considered of much profit by the professor.

From the foreman's office we proceeded to visit the vegetable garden lying north of the farm house and bordering upon the turnpike. This had but recently been located in its present position, and the ground was not yet in good condition for the best growth of plants. The season had been very wet, preventing work altogether for days in succession. Everything is planted in long rows, so that horse labor and hand-cultivators can be used to good advantage. Notwithstanding the unfavorable season, the plants were looking healthy, showing careful management. About twenty-five of the best varieties of potatoes were growing here. The Beauty of Hebron is considered the best, Early Ohio and Burbank's Seedling very excellent, and the White Elephant very promising.

Adjoining the vegetable garden is the plantation of small fruits for the supply of the boarding hall. In this we found seventy-five or eighty of the standard sorts of strawberries; also about ten of the best varieties of raspberries. The Doolittle and Mammoth Cluster had rusted badly this season for the first time. They are dug up and burned as soon as the rust begins to show. Five hundred seedling raspberries had been fruited. One hundred and forty of the best of these had been retained for further trial; also three of the poorest ever seen. Some appear to be extra good, and some have the appearance of hybrids. The Black Caps had just been cut back for the first time to about two feet in height. The excellent practice is adopted here of cultivating until midsummer, and then sowing to oats. These prevent the growth of weeds and grass, and serve as a mulch after the severe frosts of autumn. This garden also contains some eighty sour cherry trees, besides one hundred seedlings from all sorts. They are all doing well but are not yet in bearing.

Adjoining these fruit and vegetable gardens on the east is the apple orchard. This comprises eight acres of standard varieties. Some were killed out in the severe winter of '74 and '5. The soil of a part of the orchard is too black and loamy to be well adapted to the growth of trees. They are nearly all doing well, however; have made a large growth, and occupy nearly the entire space. Some of the trees have been top-grafted, for the purpose of increasing the number of sample varieties for illustration. Among these are twenty-five varieties from the south and an equal number from the far west.

Returning from the apple orchard, and under the guidance of Professor Beal, we next take a look at the sample orchard of pear, plum, and cherry trees on the high ground in the vicinity of the president's house. All the available ground suitable for the purpose, on the whole place, has been taken up by this orchard. There are one hundred and fifty of the pear trees; thirty standard varieties of five each. Cultivation for the present year had been finished, as it is not deemed advisable to work the ground at all after the first of June. This gives the orchard a rather neglected appearance, but is probably best for the trees. The trees are headed down to the ground. They are making a very thrifty and symmetrical growth, many of them having the appearance of perfect dwarfs. They are pushed forward as rapidly as possible early in the season, being fertilized with salt and bone dust. They have been set four years. There are also about fifty seedling pears. Thirty of these are from the old pear trees at Monroe. They are not yet in bearing.

There are a few quinces not yet in bearing and about thirty seedlings.

There are one hundred cherry and sixty plum trees in this orchard, all standard varieties. The cherries are of the Early Heart varieties, except a

few Kentish. Only about seventy per cent are in good healthy condition. They are beginning to bear, but the birds get all the fruit except that tied up in cloths. The plums were in bearing this year for the first time. The trees were loaded with very fine looking fruit, which had been thinned very freely. There are but seven sorts in all, beside a few seedlings. The curculio had been kept in check by the jarring process. The system of culture is the same as with the pears, except that the trees are headed two or three feet above the ground.

It is a matter much to be regretted that there is not a larger area of land here, suitable not only for the extension of these orchards of the finer fruits, but for the growth of apples as well. All the more important varieties that succeed well in our State should be grown here for the purpose of rendering students familiar with their forms and habits of growth, and to enable any one interested in fruit and fruit-growing to observe for himself the characteristics of the different varieties.

No attempt has been made of late years to grow peaches. Experiments are being tried by planting the seed from trees having the yellows. Only one of these seeds has grown, and this tree shows no sign of the disease as yet. It has been growing three years.

From the peach orchard we proceeded to the vineyard. This has been but recently set. It is north of Professor Carpenter's house and between the orchard just described and the arboretum and the nursery farther east. There are eighty varieties, mostly hardy, at the college. There are forty of Haskell's seedlings. There are three hundred of the college seedlings in one place and forty in another. About one-third of these have winter-killed or died from other causes. They have not fruited yet and seem to be mostly inferior plants.

Adjoining this vineyard is a plat of about 300 seedling strawberries, fruiting this year for the first time. About one-tenth seemed worthy of further trial,—perhaps none of them worthy of a name yet. The pistillate varieties seemed the finest.

From the vineyard we passed to the arboretum and nursery, a plantation of two hundred and eighty species of trees and shrubs, allowed to grow in rows as planted. These rows have been thinned somewhat for planting about the grounds. The silver maple has outgrown all others in the same length of time. The hardy catalpa has grown nearly as fast, and the butternut has proved a very rapid grower. Sugar maples, elms, birches and many other native trees are making a fine growth. Samples of hedge plants, such as honey locust, barberry, spirea, etc., are being tried. Several sorts of wild apples, cherries, and plums from the Bussey institute, besides several kinds of foreign wild cherries, are growing in the nursery. Some experiments are being tried with budded peach trees, compared with seedlings left where they were planted.

There are one hundred seedling currants planted from seeds of different varieties. A few are beginning to bear. There are also a large number of gooseberry seedlings from the swamp species and from the upland. Some from the upland species are not much prickly, and some are entirely smooth. Some are growing from seeds of the upland species crossed with Houghton's Seedling. Some of these are in bearing, but do not seem superior to other seedlings in bearing. Some are very fine, however, and seeds have been planted from the most promising.

On our way from the arboretum to the new botanical laboratory, we passed the sample plats of grasses, two hundred and eighty in number, all labeled. Some are simply curiosities, but the majority are of value in some way as for-

age plants. Much credit is due the professor for this collection, and much valuable information can be obtained by a few days' study of the different species.

We were interested in looking over the new laboratory, a building designed as a museum for all agricultural and horticultural products, for samples of all kinds of woods, for the Cooley herbarium and other collections of botanical specimens, for vegetable curiosities, and for recitation rooms for students in botany and horticulture. The views from some of the upper windows of this building are very fine, the one north-east across the grounds especially so. This building is well located and well adapted to the purpose for which it was designed. Between this and the greenhouse and flower garden, situated just across the little stream that flows through the grounds, is the wild garden. This is a plantation of native perennial plants, some five hundred in all, labeled, and including a large number common in our forests. The location is admirably adapted to a plantation of this kind. A shaded bank with trees on one side, a sunny bank upon the other, with brook between, and artificial ponds containing water lilies, nelumbium, and other water plants, with springs, marshy land, sedges and marsh grasses. The whole garden is arranged in wards, with the different genera by themselves as near as may be. Each plant is labeled, and the whole affords a fine opportunity for the study of botany.

The greenhouse was looking somewhat empty on account of large numbers of the plants being set in groups and borders for the ornamentation of the grounds in its vicinity. They were all looking remarkably healthy, both inside of the greenhouse and outside, showing the skillful care with which they are managed by the gardener, Mr. Cassidy. On the bank between the greenhouse and the river is a plantation of hardy grapes, trained to wire trellises. They were making a vigorous growth, and were setting very full of fruit. This low bank had been terraced with much care and presented a neat and tasty appearance.

A word in regard to the trees upon the grounds. A large number are of the original forest, and mostly oak,—the finest tree of all, it seems to me. No other has strength of character equal to it. No one ever saw two alike, and yet it is an oak every time and in all circumstances. Perhaps the finest individual tree upon the grounds, however, is the tulip tree, standing just east of College hall. Elms, maples, lindens, and the various species of pines, cedars, and spruces give variety and beauty to the grounds. The little plantations of Norway spruces and arbor vitae, planted thickly, cultivated for a few years, and removed for planting elsewhere as soon as they crowd each other, were an interesting feature of the grounds. Some Norway spruces, cut back at the top and forced to grow in a lateral direction, illustrate what may be done with this hardy evergreen. All the evergreens are making a very rapid and healthy growth. These, with the well-kept walks and drives and velvety lawns, form a scene of rural beauty seldom equaled anywhere.

I have given but a hasty sketch of what we saw. It must needs be very imperfect. It has been a labor of love, however.

Many are disappointed in the amount of work done in the horticultural department at the college. But to one who has known of the difficulties and embarrassments under which it has labored, with an annual appropriation of but \$300, with the lack of definite plan, and the unsettled condition of the whole ten years ago, the only wonder is that so much has been done.

Order has been evolved out of chaos, experiments with a definite end in view are being performed, the landscape gardening is being carried forward system-

atically and in good taste, and the department is being rounded out and developed into a consistent and symmetrical shape.

There are some things that are needed, and that should be done as soon as possible. One of these is the erection of some kind of fruit house for the preservation of fruit. This is one of things that the fruit-growers need instruction in, and this is the proper place to give it. Then the information obtained would be in an available shape for the people at large. As a means of illustration and education it might be made worth many thousands of dollars to the people of the State.

A fund should also be set apart for the purchase every year of hardy, deciduous, and evergreen trees and shrubs, until every species that will grow in our climate can be found at the college.

There are glorious possibilities in the future for the college, and the legislature should grasp the idea that liberality in regard to it will be the best economy in the interest of the producing classes of our State.

The afternoon was spent very pleasantly in the dining-room at the college, and in the chapel, where a number of the members of the different committees indulged in speech-making, responding to toasts, etc. Happy addresses were also made by President Abbot, and by General Lee, of the Mississippi Agricultural College. The day will long be remembered by all as one of pleasant memories.

Mr. A. C. Glidden of Paw Paw, read the following short paper on

MEMORIAL TREES.

How universal the desire to perpetuate a memory. It manifests itself in many forms, according to the ability or the eccentricity of the individual. The pyramids lift their immense piles to its power. The simple cairn is heaped where the warrior fell. Colleges, hospitals, and asylums, are endowed to perpetuate a philanthropic memory. We sign our names in a friend's album that our autograph at least may live after us. Every degree in the scale of being is affected by this common desire. It is the immortality within us striving to make itself audible.

While so universal, how eminently proper then to so stimulate and direct it, that the future may be benefited by our bequests. Every person who owns more than the allotted six feet by two, can build his own monument. He can place a tree or vine, or many trees and vines, that shall bespeak his thoughtful care, when he, for whom they may never have yielded their fruit, lies beneath them.

We stand before the sculptured column at the grave of a friend. Syllables carved upon the stone may rehearse his many virtues, but the thought of some generous act performed will be more to us than marble, and will last when the stone has crumbled into dust. So a tree planted by a friend is a monument—and it is more—it is a living thought. Its fruit drops at our feet, a benison from the hand of him who planted it. Could we forecast the future, and follow the far-reaching effects from some immediate cause, how would our hands be stayed when cutting away these monuments of a past age. We should see, as an effect of denuding the land of its fruits and groves, fierce winds rushing unobstructed over the fields, prostrating fences, buildings, and orchards. Long periods of drought, succeeded by terrible tornadoes, accompanied by an avalanche of rain, filling the water-courses, and tumbling toward the streams.

The usual crops would fail, and fruitful fields become barren. Where "Plenty" once "sat smiling at the door," gaunt famine would stalk abroad.

There is another picture, more pleasing and no less truthful. It is the effect of an opposite practice. The buildings are sheltered by trees; groves and clumps of trees occupy all the waste lands; the waysides are set thickly with overhanging trees; permanent lanes are marked by lines of trees; wind-breaks are located to subserve their purpose. The perspective landscape in the summer is green and grey, while the autumn adds manifold other colorings to perfect the picture. Not only is the æsthetic but the practical also is subserved. Rain-falls are more intermittent, and the danger of desolating droughts less threatening. I need not attempt to prove this,—the evidence is all toward this conclusion. Look on this picture and then on that, and say if the planting of trees is not a duty that all good citizens owe to posterity. This duty becomes more imperative upon each succeeding generation, as the native trees gradually disappear. How many homes all over the land are adorned with trees set on that memorable April day in our centennial year. If an Arbor Day in the spring of each year could be so well observed, how much would be accomplished in our day. The work of replanting the ravaged land would be given a fresh impetus. We have not yet fully purged ourselves of the inherited desire to completely rid the land of its growth of timber. When this vandal desire for cutting is supplanted by the laudable desire for planting, then will the waste places be clothed again in nature's own vesture, and the barren spots around our homes become very glory corners where intelligent ease shall swing his hammock and rejoice in his bequest. How living and lasting an epitaph is a grove of trees planted by some early pioneer. I have several such now in my mind, and there are more scattered throughout all the older settled portions of our State. They tell a forecasting of the future that is little less than prophetic. How we venerate the dead, in the enjoyment of the living tree. Spreading maples shading the wayside are a constant reminder to the passing traveler of him who planted them, while the stately column in the wayside cemetery is passed unheeded by. "There are books in trees," yea, and on every leaf a tribute to him who planted it.

Following in the same line of thought, Mr. Charles Arnold, of Ontario, spoke in rhyme of

THE OLD KENTISH CHERRY.

When now I look back to when I was a boy,
And muse on those objects that then gave me joy,
Though few things of childhood in manhood will please,
There's sometimes a life-long attachment to trees.
Some flow'ret or shrub, in our garden or lawn,
Oft carries us back to life's earliest dawn;
And there's nothing impress'd on my memory more plain
Than the old Kentish Cherry that grows in our lane.

The Snow-Drop and Crocus, the vanguard of spring—
What bright recollections these little flowers bring.
The Daphne Mezereon, whose venturesome flower
Sends forth its fragrance with the first April shower;
Our own native Balsam, with its silvery spray,
And that noble old evergreen Spruce of Norway—
These all have their charms, but my thoughts turn again
To the old Kentish Cherry that grows in our lane.

Through association some objects we prize,
 Though the sight of them start a tear in our eyes.
 Yon grape my Janet planted, south of the hill.
 Though long she's been dead, and her voice is now still,
 'Neath that vine fancy sees her, and hears as of yore,
 When sweetly she sang "Stilly Night" of Tom Moore.
 And when I first heard her, oh, I mind it so plain,
 'Twas beneath the old cherry that grows in our lane.

But apart from all this, I admire thee, old tree.
 Through many long years thou hast fruit yielded me,
 Which for canning, and drying, and baking in pies,
 From thy high-titled cousins thou bearest the prize.
 And could I induce thee, ere saying adieu,
 To marry thy flowers to some rich Bigarreau.
 Throughout our lov'd country, through time, shall remain
 The fame of the cherry that grew in the lane.

RESOLUTIONS.

After listening to very excellent remarks upon the same general subject by Mr. J. D. Baldwin, the following resolution, offered by Mr. S. L. Fuller, of Grand Rapids, was unanimously adopted :

Resolved, That the officers of this society be instructed by this meeting to communicate with the incoming governor upon the subject of tree planting, and respectfully ask him to issue a proclamation for the observance of arbor day, setting the date so as to be in proper season for the transplantation of ornamental trees.

The following, by Mr. Guild, was adopted :

Resolved, That in appreciation of the delightful display of plants, flowers, and decorations by Mr. James Toms, of Ann Arbor, the secretary be instructed to issue him a certificate of membership in this society for 1881.

The following, by the secretary, was adopted :

Resolved, That the gratitude of our society be extended to the delegations from New York, Ohio, and Canada for honoring us with their presence and assistance at this meeting; and especially that the thanks of the society be extended to Mr. Charles Arnold, of Ontario, for the fine exhibit of fruit which he has placed on our tables.

Wednesday Evening Session.

The music of the evening under charge of Prof. Alvin Wilsey was charming, and exceedingly appropriate to the exercises. The discussion on

HOW TO UTILIZE THE FRUIT CROP

Was continued for half an hour, several gentlemen speaking, but all agreeing that by drying, canning, jelly-making, etc., in times of abundance, the market for green fruit would be helped.

Miss Sara Fletcher, in connection with an explanation of her system of jelly-making, remarked as follows :

The question has been asked by our fruit-raisers, "What shall we do with our surplus fruit?" As the people cannot buy it all at its plentiful time of ripening, and as there are seasons in every year when fruit products become scarce and high, we answer: Make it up into jellies, canned fruit, preserved, and pure cider vinegar, to meet the demands of the people in the time of need. What we need is a better class of these things than we usually find upon our grocers' shelves; and why not have the raisers produce them, and assure the

people that they are what they are represented to be? Looking upon the subject in this light, it seems as if there ought not to be one particle of fruit wasted; for in these ways of caring for it, it may be kept from year to year.

It has been said here that on account of so much manufactured vinegar, pure cider vinegar cannot be sold. This, I think, is a very great mistake; for we always ask our grocer for pure cider vinegar, and, because we cannot always get it pure, we are driven to the farmer. Within the past few months we have paid 32 cents per gallon for this material. Then would it not pay the farmer better to make his cider (which he sells for from three to seven cents per gallon) into vinegar, when he knows that one-third water can be added, thereby increasing the quantity without injuring the quality? The people will buy the pure, even though it be higher in price, if they can be assured that it is such.

Again, we hear the question asked, "Can all kinds of fruit be jellied?" I answer, they can, and without the aid of gelatine. I have tried all the wild, cultivated, and imported fruits that I could obtain, and find all to make jelly quite readily; there being most difficulty with the pear and elderberry. Some of these fruits, such as the grape, currant, pie-plant, and gooseberry, are preferable, if made when green, or just before ripening, as the jelly is colorless and transparent, while the flavor is very fine. Colorless jelly may also be made from the Concord or any other blue grape when perfectly ripe, if the pulp alone is used, and care taken that none of the coloring of the skin is left in. This is one of the best and easiest made of jellies.

Quince jelly can be made from the parings alone quite as nice as from the whole fruit, although not so light in color. I have made solid jelly from this fruit without boiling after adding the sugar, by stirring until the sugar was thoroughly dissolved, and then set away to cool. This makes the lightest colored quince jelly. In making lemon jelly, I first roll the fruit until soft, then press out all the juice, and add an equal quantity of sugar, and boil 15 or 20 minutes. This will keep the year round. For the various uses we make of jellies, different kinds of fruit are desirable. Those suitable for one purpose are not for another. Some we require to be very sour, others only slightly acid, and still others quite sweet. For some purposes we need very solid jelly, for others quite soft; and in order to have all these qualities, we must use all kinds of fruit. Perhaps there are no two fruits that can be used in more ways than the apple and grape, the latter fruit making one of the most delicious preserves, if taken when green, or just before it turns color for ripening. The grape is cut in halves, and the seeds taken out. This may seem to some very tedious, but not more so than preparing any other fruit. Both the ripe and green tomato are used for preserves, which are very nice.

I think that it will pay our fruit-raisers far better in the end to use up their fruit in these ways than to grind it up into cider, or press it into wine by which our men are made criminals, and their families paupers. What we ask is that the fruit may be so preserved that the whole family can enjoy it without injury to one single member of it.

The following paper, by Dr. Conklin of Manchester, closed the discussion:

MR. PRESIDENT,—The subject that has been assigned me for discussion before this honorable body by the president of the pomological society, of which I have the honor of being a member, is one that especially interests the fruit growers of Michigan, and that is, how to best utilize our fruits.

What little I may have to say upon this subject will be in reference to the more perishable varieties, namely: peaches and our smaller fruits.

The peach crop is the one chiefly to be considered by me. Of course, the most merchantable part of them can be sold, and another part may be dried, also another part may be canned. And now we are left with the most difficult part of our subject to solve; What can we do with and how can we dispose of those too mellow to be used in the ways heretofore mentioned, and during a glut in the market? Can we not devise some means to stay the process of ripening, and thereby hold our peaches and other fruits a few days until the over supply is lifted from the market, and it demands that which we are holding back.

Take for instance this season's crop of Early Crawfords, when the market was perfectly glutted, the business to all appearances overdone, thousands of bushels dropping upon the ground and suffered to go to waste, too mellow to be used in any of the known ways, and unless some way is devised by which we can utilize this part of the crop, we must necessarily suffer heavy losses. Now the question is, can we not devise some method by which we can stay the process of ripening, and also use those matured too much to be placed upon the market? If we can, then success will crown the fruit-grower's efforts.

This subject has received much consideration from me during the past year or two, and from my own investigations, and what information I have been able to glean from others, I believe a refrigerator or cooling room can be so constructed, that by placing our fruits in it, at the proper time, we may be enabled to hold them for a few days, or a few weeks at any time, as desired.

During my investigations of this matter, I have had the pleasure of looking through a newly constructed cooling-house at my place, the walls of which are nearly two feet thick, being ceiled tightly outside and in, and filled between the studding with sawdust, calculated to make the whole structure air tight. The upper part of this building is a large chamber, calculated to hold several tons of ice, beneath which is the cooling room, so constructed that the cold air is constantly falling into it from above, holding the temperature at about thirty-six or thirty-eight degrees. This room is so constructed, also, that no dripping of water from the ice above can reach the fruit or anything below. It is only cold, dry air, that comes in contact with the fruit.

In a room of this kind I believe we can hold our peaches for a number of days.

I am informed by the gentleman who put up the cooling house spoken of that some parties in Toledo placed quite a quantity of grapes in one of these rooms and kept them several months perfectly, and when taken out realized a high price for them. A gentleman in our place kept strawberries two weeks last summer in a small house refrigerator. He related his experience to me in this matter, knowing I had the subject under consideration, and the more I investigate it the more I become convinced of the feasibility of it. If strawberries and grapes can be kept, why cannot peaches?

Now, in conclusion, we come to the subject of mellow peaches—those too ripe to dry, too ripe to ship or can. I believe these may be utilized by pressing out the juice, and from it making a jelly similar to that made from the apple by the same process, evaporating it from eight gallons to one, without the addition of sugar. This is a matter which will receive my special attention the coming season; it is a subject that earnestly invites the attention of every fruit-grower.

I would like to say more upon this topic, but I have already trespassed too long upon your time, therefore I will leave the subject with you for your consideration, and take it with me for further investigation.

COMMUNICATIONS.

The following letters were presented by the Secretary :

Adrian, Nov. 8, 1880.

Secretary Chas. W. Garfield:

You will perhaps recollect that I was appointed a sub-committee to report to the State Horticultural Society, at their June meeting, the action of a committee appointed to name, etc., a certain apple, which was done so far as practicable at that time. I will now add for the December meeting a description which may not prove entirely accurate, as my former acquaintance with it has had no reference to such description, and from the few specimens seen this fall I may fail in some respects, especially as to flavor in their green condition. It is barely possible it may yet prove an old named variety.

Morris Red.—Fruit medium to large, variable in form, inclining to oval or conic, generally broader than high. Color a beautiful red, indistinctly striped with lighter and darker shades, russet about the stalk often radiating in streaks and blotches to some distance round the base, and in patches partly down the sides, and russet dots nearly to the calyx. Stem medium, or about even with the base, in a moderately deep cavity. Calyx small and nearly closed, in a medium basin. Flesh yellowish white, juicy, tender, sub-acid; quality, very good. Jan. to April. Tree vigorous, with strong, stocky, rather short jointed, young growth. Leaves large; buds prominent. Supposed origin, Conn.

B. W. STEERE.

South Haven, November 11, 1880.

Secretary C. W. Garfield:

SIR,—The undersigned, designated as committee on screens and wind-breaks, and charged with the duty of examining and reporting upon the entries of John W. Humphrey, of South Haven, and Benj. W. Steere, of Adrian, in this division, respectfully represents that the hemlock screen entered for premium in class one was planted in the spring of 1876; the plants sit in a single row, one and a half to two feet apart. It has not been clipped or sheared as yet, although that is intended to be done in the future. The whole now has grown into a compact mass about three feet in breadth at the base, and averaging about five feet in height. It stands along the northerly border of the nursery grounds, about thirty to thirty-five rods in length, and is already somewhat effective as a protection, as well as a beautiful illustration of the adaptability of the hemlock spruce for such purposes. We recommend that the premium offered be awarded to Mr. Humphrey.

The second entry of Mr. J. W. Humphrey is near the foregoing, consisting of about sixty rods of Norway spruce, planted in a single row along the west side of the nursery grounds, with an L extending into and dividing the same, the purpose being to maintain it as a wind-break or protection against the winds from the lake adjacent. These were also planted in the spring of 1876; and are now from six to eight feet in height, standing five or six feet apart—the idea of the planter being to check, but not to wholly arrest the force of the lake winds.

This will require yet a year or two of growth before it can become fully effective, by which time the side branches will have filled the entire space, forming a continuous mass of foliage. We recommend that the premium be awarded.

The farm of Mr. Steere, on the entire west side of which his screen is planted, is about one and one-half miles north of the city, in the township of Adrian. The screen is composed of mixed evergreen trees, including Scotch and white pine, arbor vitae, hemlock, Norway spruce, and a few larch. The screen proper is about 38 rods long, running north and south, and ranging from 20 to 40 feet high, planted part of the way in double rows and at irregular intervals. The trees are from 12 to 20 years' growth, and large enough to make a solid break most of the entire length of it. This entry, according to the premium list, does not come in competition with Mr. Humphrey's. We recommend that the diploma offered be awarded Mr. Steere.

Respectfully submitted,

T. T. LYON,
S. B. MANN,
Committee.

REPORT ON PREMIUM FRUITS.

Your committee on awards of premiums for best five plates of varieties of apples for market, cooking and dessert, beg leave to make the following report:

We find on exhibition a fine display of apples from all parts of the State, including most of the best varieties grown in Michigan. There are nine exhibitors competing for premiums in this class. All of the exhibits are not only a credit to the exhibitors, but to our State.

We were instructed to award premiums for the best five varieties of winter apples for market, also the best five varieties for cooking, and the best five for dessert.

The first difficulty met with was to determine the list to comprise the best market winter apples. After some deliberation, we decided upon the following named varieties: Baldwin, Northern Spy, Red Canada, Rhode Island Greening, Jonathan, Wagener, Ben Davis, and Twenty Ounce. It was with considerable hesitation on the part of your committee that the Ben Davis was allowed a place in the list, and then only upon its merits as a shipping apple for the west, the quality being placed very low in the scale. The fruit, as a whole, was quite free from worm-holes; in this respect showing quite an improvement over exhibits in some former years.

AWARDS.

Best 5 plates winter apples for market, J. N. Stearns, Kalamazoo, upon the following list: Baldwin, Northern Spy, Red Canada, Jonathan, and Ben Davis; \$5.00.

Best 5 plates winter apples for cooking, H. F. Thomas, Jackson, on the following list: Rhode Island Greening, Baldwin, Yellow Bellflower, Esopus Spitzenburg, and Northern Spy; \$5.00.

Best 5 plates winter apples for dessert purposes, S. W. Dorr, Manchester, on the following list: Newtown Pippin, Hubbardston Nonsuch, Jonathan, Belmont, and Wagener; \$5.00.

The plate of Wageners in this last collection was worthy of special mention.

Mr. Dorr's collection of market apples was very fine, and every variety the committee marked 10; but one sort, the Golden Russet, not being on our model list, the first premium could not be given.

Your committee believe it to be for the interest of this society to offer a small premium upon the best apples for all purposes, the same as it has at this

meeting, and would recommend the same plan to be continued, thus calling out the best fruit grown in the State, which adds very much to the gratification and instruction of all who attend our meetings.

Your committee would further recommend that the secretary of this society take measures to get a report from all the local societies in the State upon what five winter apples have proved most profitable in their respective counties for market purposes, and report the same at our next meeting. All of which is respectfully submitted.

G. H. LA FLEUR,
Chairman of Committee.

REPORT ON OTHER FRUITS, ETC.

Your committee on fruits not exhibited for premiums beg leave to report that we have given the fruits so exhibited as careful an examination as we well could, and we find very many fine specimens of choice fruit that, if they had been entered for premiums, would have, we think, sharply contested the prizes with those so entered.

Among those we examined, and we may have unintentionally omitted some, we are gratified to mention in terms of high commendation the following, viz:

One plate of Tompkins county King, by Mr. Collar, of Adrian.

One plate each of King, Baldwin, and Twenty Ounce, fine and choice, by Mr. S. W. Dorr, of Manchester.

Four plates of beautiful Red Canada, by Mr. E. Buel, of Kalamazoo—the finest exhibited.

One plate of Mother—very toothsome—by Wm. K. Emmons, of Kent county.

Several plates of McLellan, by H. Dale Adams, of Galesburg.

We are also much indebted to Messrs. Chas. Arnold and Wm. Saunders, of Ontario, Canada, for a fine exhibit of a number of varieties of apples grown in that section. This collection is very interesting, and shows that “over the river” we meet pomologists of great zeal and intelligence. The exhibit embraces samples by Mr. Arnold of the following: Lady’s Blue Pearmain, Arnold’s Beauty, Ontario, Ella, Beauty, and four plates of seedlings grown from seeds obtained by crossing the Northern Spy with Spitzenberg and Wagener.

Those exhibited by Mr. Saunders were Cox’s Orange Pippin and Swayzie Pomme Gris (this apple is claimed to be an improvement over the old Pomme Gris, and we are inclined to admit the claim to be well made), and Grimes’ Golden.

There were also exhibited 1 plate of large and fine Jonathans, by H. C. Sherwood of Watervliet,—another plate of apples which we were unable to determine whether they were not for premium or otherwise.

We must also mention the obligations the society is under to Dr. Conklin and Messrs. L. D. Watkins, J. D. Baldwin, and Emil Baur for pears exhibited; also to Mr. Baldwin for quinces exhibited; and Mr. T. S. Hubbard of N. Y. for beautiful stems, well preserved, of the Prentiss grape; also to Dr. Conklin for a little beautifully preserved bunch of Prentiss grapes. Also to the Niagara Grape Company for stems of the excellent white grape called the Niagara. Here, too, we must not overlook Mr. Woodruff’s white grape, the “Ann Arbor,” which certainly possesses very noticeable features, and is highly commended by those whom we accept as authority; well preserved Salems were

shown by Mr. Baur of Ann Arbor. Jellies, in variety, delightful in appearance, were shown by Miss Sara Fletcher, Mrs. Emil Baur, and Dr. Conklin.

Evaporated fruits of fine appearance and excellent flavor were found on the tables from E. M. Potter of Kalamazoo and from John Williams of South Haven.

But your committee cannot further extend this notice. The entire exhibit is admirable, and the society is much obligated to all the friends who by their contributions have thus added to the pleasures of this meeting.

G. W. LAWTON,
H. C. SHERWOOD,
E. BUELL,

Committee.

REPORT ON PLANTS AND FLOWERS.

The only collection of plants on exhibition is that of Mr. Jas. Toms of Ann Arbor, who shows a very nice assortment. A beautiful example of *Chamærops humilis* is certainly one of the finest objects in his collection. There are also many groups of plants well worthy of the attention of the members; among them we would mention ten varieties of *Begonia*, including four handsome forms of *Begonia rex*, and a specimen of *Begonia ruber*, flowering freely. There are two interesting *Echeverias*, *Sanguinea*, and *Metallicum*, seventeen varieties of *Coleus*, including fine examples of some of the newer sorts; also nine distinct varieties of geraniums, some of them in flower. A handsome and healthy example of *Cyclamen persicum*, crowded with flower buds, just pushing out, deserves notice. There are also good specimens of the century plant, the gold spotted *Euonymus Japonicus*, the box tree, a very pretty and brilliant colored *Alternanthera*, a handsome cypress, in flower, good examples of the double white daisy, some pretty primulas, including the double white and double red, six varieties of ferns and several handsome cacti.

Among other specimens deserving of notice we would mention the English ivy, *Agapanthus variegatus*, some lycopodiums, two varieties of heliotrope, in flower, the variegated Jerusalem cherry, *Stevia Lindleyana*, in bloom, *Bilbergia miniatum*, and a *Coprosoma*, a very pretty, half hardy, variegated, woody shrub, with a very glossy, waxy foliage, also a healthy looking *Azalea*, giving promise of abundant bloom.

Mr. Toms also shows some very pretty bouquets of cut flowers, including white and colored carnations, heliotropes, *Stevia*, etc. To Mr. Toms is also due the credit of the handsome motto, tastefully bordered with evergreens, and the other decorations which adorn the entrance to the Hall.

Mr. Cousins, florist, South University avenue, exhibits a handsome basket of flowers, chiefly roses and carnations.

Your committee regret that owing to the very severe weather prevailing, this interesting portion of the exhibit has been necessarily restricted to such plants as could be easily handled, and would bear some exposure. Had the weather been finer a much larger display would doubtless have been made.

WM. SAUNDERS,
MRS. P. COLLIER,
A. C. GLIDDEN,
W. J. BEAL,

Committee.

The reports of the several committees were accepted, adopted and ordered printed in the minutes of the meeting.

IN MEMORY OF J. P. THOMPSON.

The programme had arranged for exercises in memory of Mr. J. P. Thompson, and Mr. S. L. Fuller of Grand Rapids said :

Mr. President, Ladies and Gentlemen:—It is eminently proper that this meeting should, before its close, pay a tribute of respect to the memory of Jonathan Palmer Thompson, late President and Secretary of this society, whose familiar face we miss at this, our annual meeting. Let us pause for a while from the rush of business to snatch from the oblivion, which so speedily overwhelms and swallows up the incidents of a life, so hurried as our own, something of the story of our departed friend.

Not very long ago it was said of a deceased member of the bar in Grand Rapids: "His sins need no mantle of charity, and his deeds need no excuse." These words seem equally applicable to our late friend, of whom I am asked to speak to you on this occasion. I account myself honored in being bidden to such a task, though I feel myself poorly able to accomplish so sacred a duty. In the *Detroit Post and Tribune* of July 8, 1880, I find this notice :

Mr. Jonathan Palmer Thompson, a well known editor and agricultural writer of this State, and for many years agricultural editor of the *Post and Tribune*, died Tuesday morning at 12:30, after a long, painful and hopeless combat with that terrible illness, Bright's disease, during which, however, he has continued his editorial work with courage and patience. He was born July 24, 1826, in Bloomfield, Hartford county, about six miles from Hartford city, Connecticut. Although left an orphan at a very early age, both of his parents having died before he reached his sixth year, especial care was bestowed upon his early education. While residing in Hartford his training was committed to the care of private tutors. Among those from whom he received instruction was the Rev. Dr. Robinson, of Middletown, Orange county, N. Y., who was succeeded by the Hon. William Bross, then principal of an academy at Ridgebury, Orange county, since known as the founder of the *Chicago Tribune*. Under his charge he passed through a course of studies covering several years, embracing the usual collegiate branches. Some short period after this he resided with his brother, Charles R. Thompson, of Stewartville, Warren county, New Jersey, where he became a favorite student of Prof. Jno. S. Labar for a number of years. He subsequently commenced to study law with Hon. Isaac Toucey, who at that time was governor of the State of Connecticut, and finally took a full law course at the Dane law school, Harvard. Profs. Greenleaf, Story, William Kent, Theophilus Parker and other distinguished professors were among the members of the faculty at the university at the period, and among others with whom Mr. Thompson was at the time acquainted, and with whose careers many pleasant personal recollections were associated, were Professors Agassiz, Horsford, and Wyman.

After graduating at the law school of Harvard, Mr. Thompson located in Lansing, the capital of this State, in 1848. He met there an office confrère of former days in the person of Judge Wm. H. Chapman, who still lives in Lansing. Judge Chapman was one of the first residents at the State capital, having settled there in March, 1848, and Mr. Thompson following in August of the same year. They formed a law co-partnership at this period, Mr. Thompson having purchased a fine law library in New York, on his road to Lansing. Neither of

the partners ever practiced law to any great extent, as might naturally be inferred from the immediate surroundings in which they found themselves placed. Mr. Chapman turned his attention more particularly to real estate operations, and Mr. Thompson devoted himself to journalism.

About the year 1852, Mr. Thompson became editor of the *Lansing State Journal*, then owned by Peck & Harmon. He remained connected with the *Journal* until 1856, when it had acquired a position as a democratic paper of national weight and importance. Mr. Thompson attended the national convention in Cincinnati in that year, and through the influence of General Richmond, of Grand Rapids, he shortly afterwards assumed the editorial charge of the *Grand Rapids Daily Herald and Enquirer*, upon the retirement of the Hon. Thomas B. Church from the position. The *Herald and Enquirer* was published and owned by Messrs. Barnes & Taylor, who subsequently became publishers of the *Detroit Free Press*.

Mr. Thompson followed Stephen A. Douglas in his course in regard to the territorial question, which led to the disruption of the democratic party, the formation of the republican party, and the precipitation of the rebellion. He also sought to enter the ranks of the army, but owing to the condition of his health, he was not permitted to enlist, and he turned with renewed ardor to his duties in the field of journalism.

In 1860-61 he directed special interest to the study of practical agriculture and horticulture. He assisted in establishing the Michigan State Pomological Society, now known as the Michigan Horticultural Society, and other societies with kindred aims and objects. While associate editor of the *Grand Rapids Eagle*, the republican journal of that section, Mr. Thompson gave the widest possible encouragement to the development of the agricultural interests of the State, and the lasting good which he effected at that period, in the promotion and extension of practical agriculture is felt to the present time, and has been universally acknowledged.

For two years, 1876-7 and 1877-8, Mr. Thompson was secretary of the Michigan State Agricultural Society, and for the last three years has held editorial charge of the agricultural department of the *Post and Tribune*, and the popularity and esteem in which he was held cannot be better attested than by the favor and acceptance with which his labors in this special department were regarded. Its readers, in his untimely death, will mourn the loss of a near and intimate friend. To a rare courtesy and grace of manner, Mr. Thompson united many admirable social qualities. He was at all times a welcome and conspicuous participant in the various conventions and organizations which had the promotion and development of agricultural science for their special aim, and his absence will be seriously felt in future gatherings of this character, not alone for the personal esteem in which he is held, but for the valuable impetus which he gave to their advancement and progress.

Mr. Thompson belonged to the masonic fraternity, having been one of the original charter members of the first lodge which was established in Lansing.

To sum up this in brief would read something like this: July, 1826, born in Bloomfield, Connecticut; 1832, an orphan; 1840, a student in Orange Co., New York; 1847, a graduate of the Harvard Law School; 1848, a lawyer in Lansing, Michigan; 1852, editor of the *Lansing State Journal*; 1856, editor of the *Herald and Enquirer*, Grand Rapids; 1860, associate editor of the *Grand Rapids Eagle*, making a specialty of the development of the agricultural interests of Michigan; 1872, President of the Michigan Pomological Society; 1873

to 1876, Secretary of the Michigan Pomological Society; 1876, Secretary of the State Agricultural Society; 1880, he died, leaving a widow and two sons.

My friends, there is his history—born—lived—died. That is the history of us all—the difference between us is in the living. He was an orphan at six years of age. The very word *orphan* usually implies a *history*; with that word we all associate trials and troubles. But it is not upon his early career I will dwell, you have listened to his life and know something of his writings, and without rehearsing more of the one or the other, I will speak of him as a man and as a member of this society.

In the sketch of his life we catch sight of the struggles, the trials, and the successes attending it. We do not see the unselfish devotion to the cause we represent here. His work among us was missionary work in its highest sense, and it was performed often, I may say *always*, under the torture of physical pain, for he was for years a martyr to disease. His courage through it all was only equaled by his patience.

In 1870 Mr. Thompson, with a few other gentlemen, met in Grand Rapids and organized this society, and from that day he never ceased to labor for it. His position on the press, added to his ability, made his aid important. His help was never given grudgingly. He worked for this society with his whole heart, and his work had an increased value because of his being a member of it, as a man may love and fight for a cause outside the ranks, but can never do as efficient service and be as highly honored as if he were a trained and uniformed soldier. He had the valuable faculty of recollecting the names and faces of those he met, and an extraordinary aptitude in discerning their individual character, so that if aid was required he knew the peculiar adaptability of each man for the work needed. For him to meet a man was to know him. He was unselfish. In his work for this society he sought only its good and not his own aggrandizement. He was fair and honest in his dealings, a courteous Christian gentleman, a manly man. I have spoken of his remarkable memory of men and names. He had also an unusual talent for recollecting passing events. Frequently at public meetings I have wished he would take more ample notes, fearing that his assiduous attention to the business of the day would prevent his giving publicity through the press to matters transpiring of interest to the community in general, but these fears were groundless—the next issue of his paper would contain an accurate report of every important transaction; nothing seemed to have escaped his observant eye, his vigilant—I might almost say intuitive—recognition of what had occurred.

I said Mr. Thompson was a Christian gentleman. I hope it will not be invading the sanctity of private life to mention an interview I had with him in May, 1871, when he was at the age of 45 years. The day previous he had been baptized. When I took him by the hand and congratulated him on the step he had taken, he said with moistened eyes, "With God's help." When afterwards so many times I have seen him stretched on the bed of sickness, racked with pain, or moving slowly and painfully about with the help of his stout cane, as I felt the cordial grasp of his friendly hand and heard his ever cheery voice, the words "with God's help" would recur to me. But I will not enlarge on his private virtues. We who knew him loved him. Certainly this society as an association cannot forget his services, for to him, more than any other man, may be attributed any success it has achieved. His ability, his zeal and good judgment gave weight, and his position as an editor publicly, to our proceedings, carrying interest and influence where otherwise they would have remained unfelt and unknown.

He inspired us all with something of his own courage and public spirit, and we mourn his loss as friends and as citizens. I have spoken of him as I knew him as a man, as an editor and as a citizen, and I think those of you who knew him, will say that the encomium bestowed upon him when I began is not too laudatory, namely, "that his sins need no mantle of charity and his deeds need no excuse."

The Secretary read the following letter from the first Secretary of the society:

DEAR SIR,—I am very sorry that I am unable to be with you at this meeting to take part in the memorial expressions of esteem and brotherly love for our late friend and ex-president Jonathan P. Thompson.

How much this society owes the fact of its existence to-day to him will probably never be known; in fact, it would be hard to those who in later years have witnessed at our meetings the congregated intelligence, pomologically speaking, of the entire State, to recognize the gathering as of the same organization as the one held in a back room in Luce's Hall, Grand Rapids, ten years ago next April, where he first saw us.

No one probably, present at that meeting, recognized so fully the labor that would be required to produce from that embryo the ideal society we sought, nor none undertook his share more intelligently or cheerfully than Mr. Thompson. His previous experience as a writer for the public press enabled him to most thoroughly understand the need of advertising us to the people in the best manner, and his versatile and willing pen was a powerful vehicle in bringing us to favorable public notice.

Later, as president and secretary, although confined to his room nearly all of the time, and suffering much, no stone was left unturned to bring into our ranks the best fruit-growers from every nook and corner of the State; and possessing as he did, a wonderful talent in reading human nature, he seemed able to say the right word, at the right time, to the right person, and he always said it.

Sometimes it seemed to me he was given to favoritism, but when I assailed him upon the subject found myself confronted by his great big heart, and was completely overcome by him, and generally found afterwards that he was really at work for the greatest good for the greatest number. And, while I know nothing of his religious beliefs, nor to what church, if any, he belonged; yet I feel confidence in his future, when I think that the fate of so kind a brother (he called us all brothers), so good an adviser, and so true a friend, is in the hands of a just God.

Respectfully,

A. T. LINDERMAN.

Mr. Pearsall said:

I call to mind the interest in our work and the indefatigable exertion he has made for the advancement of this society that he so much loved. When his disability was such that he could with difficulty walk, yet he would always be at his post, when acting secretary; and we always looked with interest and profit to the productions of his pen; and I am glad that we can call to mind the departed with so much interest, and while we may say "peace to his ashes," we may not forget that a "great man is fallen," and "our loss is most certainly his gain."

Mr. H. Dale Adams, after calling to mind a number of pleasant incidents connected with his personal knowledge of Mr. Thompson, offered the following resolutions, which were unanimously adopted by a rising vote:

WHEREAS, By the death of Jonathan Palmer Thompson this Society has lost one of its earliest and best friends, whose efforts were untiring for its success, and whose wise counsels have largely contributed to its present prosperity; therefore

Resolved, That in the death of Mr. Thompson this Society has lost a wise counselor, sincere friend, and a most earnest worker, and the State a most valuable citizen;

Resolved, That these resolutions be spread upon the records of this Society, and a copy be transmitted by the secretary to the family of Mr. Thompson.

The choir closed the exercise by appropriate music, following which Mr. A. C. Glidden offered the following resolution, which was adopted:

Resolved, That the secretary be instructed to secure an engraving of Mr. Thompson to be placed in the transactions of the Society as soon as practicable.

Mr. Adams then spoke at some length concerning the desirability of preserving a record of our deceased members, explaining that a volume could be secured for this purpose at no great expense, in which could be preserved a short sketch of the lives of the members who had gone from us, with, perhaps, their photographs.

On motion, the officers of the Society were asked to secure a record of this character, and Mr. Adams was invited to place his plan in definite form for the use of the officers in deciding upon the matter.

RESOLUTIONS.

The committee on resolutions reported as follows:

Mr. President and Members of the State Horticultural Society:

During this tenth annual convention of the Michigan State Horticultural Society we have been so hospitably entertained, our wants anticipated and so thoroughly provided for, even beyond the expectations that were raised by the cordial invitation to hold our sessions here, and we are placed under obligations to so many people and friends, that it is difficult to mention them in detail with any assurance that none shall be left out. We will name, however, the officers and members of the Washtenaw County Pomological Society, and the citizens of Ann Arbor generally for their courteous treatment and hospitable entertainment on this occasion; the ladies and gentlemen who by their delightful music have added so materially to the pleasure of our meeting; the local committee having in charge the management of the meeting; the officials who have granted us the use of the commodious audience room and other comforts connected with the sessions; the professors of the State University, Agricultural College and Normal School, who have furnished us the admirable addresses for our instruction and entertainment; to acting President Frieze for his kind invitation to visit the University, and for his politeness in showing us through the buildings of the various departments; the officers of the past year, who have devoted much of their time to the advancement and interest of the society and its objects, and especially to our worthy president and efficient secretary, whose incessant labors have become a part of the history of this society, and, in fact, of the horticulture of the country. In acknowledgment of the kindly offices thus rendered; therefore, be it

Resolved, That the sincere thanks of the State Horticultural Society be tendered to each and all of the above mentioned, and that the same become a part of the records of this society.

Short addresses were made by a number of the members, speaking in the highest terms of praise of the good time enjoyed during the annual meeting, after which the resolutions were adopted by an emphatic vote, and the convention adjourned *sine die*.

HISTORY OF MICHIGAN HORTICULTURE.

Early in the year 1880 the secretary presented to the executive board of the State Pomological Society a plan by which the history of Michigan horticulture could be worked into shape and preserved in the transactions of the society. The plan was adopted, and the secretary set about the work.

Correspondence was opened with men in nearly every county in which fruit is grown, with the hope of finding some one in each county who would undertake to gather up the horticultural history and statistics for his own section. This was a slow process, and after a long time, men were found in the most thickly settled counties, who would undertake the work. It was thought that the matter could be pretty thoroughly worked up during this year, and a report made in the volume for 1880 that would approximate completeness. But in every case the county historians found they could gather the information only by personal interviews with the persons who knew the facts. Correspondence was comparatively useless; and, because of the difficulties in the way, there have come to the secretary's office but very few reports. There are a number of others that are under way, and will be completed another season.

It will be readily seen, then, that what seemed to be a very short work, will, with our lack of funds to use, and our dependence almost entirely upon the voluntary unremunerated assistance of men interested to secure the history but unable to give much time to it, take at least another year to complete.

As soon as a correspondent was found in any county, the following circular and list of questions were sent him.

STATE POMOLOGICAL SOCIETY, }
SECRETARY'S OFFICE, }
Grand Rapids, Mich., May 21, 1880.

MY DEAR SIR:—I want to save in the next Pomological Report all the facts I can get concerning the history of tree-planting and orcharding in Michigan. It seems to me an important thing to do before they are lost. You have been suggested as a person who would be willing to aid in this purpose. I want your county represented, and enclose a list of questions that will serve as a guide in gathering the facts. If you cannot do this will you kindly put the matter into some one's hands who will see your county represented. If the history is in my hands by last of July it will answer. Hoping that you can aid us in our undertaking,

I am yours very truly,

CHAS. W. GARFIELD.

CIRCULAR.

1. When and where were first fruit trees planted in your county?
2. Name some early orchardists, with incidents in connection with their work.
3. Give any facts about introduction of special varieties.
4. Where was first nursery in your county?
5. How many nurseries now in your county, and their acreage?
6. Do you know of any varieties originating in your county?

7. When and what was first fruit exported from your county?
8. Give any facts you can about old trees in your county.
9. Have you ever had a destructive visitation of insects—if so, when, how and what?
10. Can you mention any exceptionally large yields of fruit in your county?
11. Give short histories of any horticultural societies you have ever had in your county.
12. Have you any fruit-preserving factory—if so, describe its work?
13. Can you give any facts and statistics of shipments?
14. Can you name any other peculiarities of the horticultural history of your county?

The above questions are sent you that we may gather the facts in connection with the horticultural growth of Michigan before they are lost. Will you help us all you can in our endeavors? Please address all replies to Secretary Chas. W. Garfield, Grand Rapids, Michigan.

In response to the letter and circular there were a great many replies, but the last of July came, and with it a number of requests for more time, and the time was extended to September 15th, when the majority wished to be allowed until 1881 to complete the work in anything like a satisfactory manner.

The few reports that have been received are given substantially as sent into the office, and will seem to start off a work that may require several years to complete. It seems worth the while, however, to get the statements as accurate as possible, and save them where they may be referred to by any who may be interested in the progress of our horticulture.

Even in the counties represented in this volume new facts may come to light which will be added another year.

The counties reporting are given in alphabetical order.

ALCONA COUNTY.

REPORTED BY C. P. REYNOLDS, OF HARRISVILLE.

This county is situated on the west shore of Lake Huron, about half way between Saginaw Bay and the Straits of Mackinaw. Its early settlers were fishermen and lumbermen, who paid little attention to what the soil might produce. In 1846 S. M. Holden planted a garden on the bluffs of the lake with so much success that he was encouraged to plant a small orchard in 1848, of which a few apple trees still remain and bear fruit of three varieties: R. I. Greening, Snow, and Harvest apples. These are the oldest fruit trees of the county.

Charles Briggs, another pioneer, planted an orchard in 1860, bringing his trees from Rochester, New York. This is the largest bearing orchard in the county. In 1861 George H. Blush and William Beaver also planted orchards that have successfully fruited apples, pears, cherries, and plums with varying success. The experiences of these early tree-planters have taught their successors that some varieties are better adapted to their soil and climate, and that where the Red Astrachan, Wagener, and Northern Spy flourish many other kinds prove failures. Acting upon such valuable information, several larger orchards have been planted by farmers who are located back from the shore, on soils and in locations better adapted for fruit-growing, where the Red Astrachan, Wagener, Northern Spy, and Duchess of Oldenburg are giving early promise of better success.

The plum has not been visited by the curculio pest, and is being planted quite liberally. As yet very little has been done in small fruits because of the

abundance of wild berries. But the Concord grape ripens here, and cultivated small fruits are being slowly introduced.

We have no horticultural society organized, and the fruit interest is encouraged by the agricultural society, organized six years ago, and several good exhibits of apples, pears, and plums have been made at the fairs of the society. Many of our people are evincing an increased interest in the reports of the Pomological Society, and, though remote from the exhibitions of your products, a few have visited some of the grand displays of that most prominent fruit interest of the State. The general impression among our people is, that although far removed from the much boasted "fruit belt" of the State, we shall yet produce the home supply of fruit by a more careful selection of hardy varieties adapted to our location, and by improved methods of cultivation, for which we are already indebted to the energy and liberality of the Pomological Society.

BENZIE COUNTY.

REPORTED BY J. J. HUBBELL OF BENZONIA.

Was first settled in 1858 by a colony from Ohio, which located at Benzonia, eight miles back from the lake, on the high lands at the head of Crystal Lake.

This Crystal Lake is only separated from Lake Michigan by a low sand ridge, so that the influence of the large lake is carried inland to Benzonia in much the same way as it is carried into Grand Traverse county by Traverse Bay. A settlement was also made at the mouth of Betsie River, now known as Frankfort, about the same time; but as the principal business was dealing in wood and lumber, but little attention was given to the planting of fruit trees. On the other hand, at Benzonia almost every settler planted a small orchard, as soon as he had land enough cleared for the trees to stand upon. As examples of this, I would mention Rev. C. E. Bailey and his brother John Bailey, who set their door-yards out to peach trees, raised from pits brought with them. They also set small apple orchards. The following persons also set apple and peach trees with some pears and plum trees: Horace Burr, Wm. Steel, J. R. Burr, J. B. Walker (2 orchards), L. W. Case, Rev. Geo. Thompson, W. S. Hubbell, E. Niell, and A. S. Case. While at Frankfort, R. Bull and Mr. Oliver set orchards at about the same time, and as the county settled up many others followed.

But little attention was paid to varieties at first, as it was all guess work as to what would succeed, and nursery men sent about what they liked. But few took any care to preserve the names of the kinds they had set, so that to this day not one-half the varieties produced by these old orchards are known, and they form a constant study and puzzle to pomologists to name them. The kinds that are being planted now are mostly Golden Russet, Wagener, Rhode Island Greening, Grimes' Golden, Northern Spy, and Red Canada, for market; while for family use the Benoni, Porter, Red Astrachan, Fameuse, Dutchesse of Oldenburg, Chenango Strawberry, Lowell and Primate, are the most sought after.

There are no nurseries to speak of in our county, but there is a good chance for some one in that line. As to new varieties I might mention one tree among the seedlings set by Mr. C. E. Bailey as giving good promise. It is of the late Crawford type, but has not been disseminated to any extent as I know of.

L. W. Case has a very good seedling apple, of very good size and quality, and a good keeper. We will be glad to send specimens to Mr. Lyon or any one if wanted this fall. No fruit to speak of has been shipped as yet from this county. The old orchards are small, and set only for family supply. Many of the trees proved to be unprofitable, not the right kinds for us. Many large new orchards have been set within the last few years. A few plums, and, I think, pears, have been shipped from Frankfort and brought extra high prices, as they were of very superior quality. I do not know as we have ever had a very destructive visitation from insects. We have our quota of the curculio, codling moth, tent caterpillars, etc., etc.

The Benzie county agricultural society has been the only society that has paid much attention to horticulture. This body has had regular annual fairs since 1863, and the most prominent part of its exhibition has been the show of fruit. We have never failed to have an exhibit of peaches, pears, and plums, as well as an abundance of apples. It was this county that showed in competition with Grand Traverse county at Traverse City in the fall of 1873, when the State Pomological Society met there.

Latterly there has been a society formed at Benzonia, known as the Benzonia Pomological Society. This society has quarterly meetings for discussion and show of fruits. We shall try and re-organize as a branch of the State society at our next meeting in September.

There was a pomological society formed at Frankfort, but nothing has been heard from it recently.

I would, in conclusion, mention the following men as interested and engaged to a greater or less extent in fruit-growing in our county at present: C. F. Hopkins, S. Small, H. O. Mack, J. A. and W. J. Pettett, J. R. Burr, John Vaudmun, and A. B. Adams, of Benzonia; A. G. Butler, H. M. Spicer, N. A. Parker, and Dr. Voorhies, of Frankfort; Wm. Voorhies and Mr. Axtell, of Blain; H. Cooper and John Greenwood, of Gilmore; C. Parker, of Joyfield; W. Case, of Homestead; J. Reynolds, of Ireland. There are probably others whose names I have not.

BARRY COUNTY.

PREPARED BY GEO. K. BEAMER, OF IRVING.

I have made diligent search to obtain the historical facts relative to the early or pioneer work in horticulture in the county of Barry. Hunting them out has been a work of no little difficulty, partly from the weakness of human memory of the few pioneers yet living, and more because so many are dead. Thirty-five to forty years will remove by death a great number of men and women who were already twenty-five to forty years old when they commenced life in the wilderness. I think I was not entirely unprepared for this work which you called on me to do. I was born and brought up in one of the best fruit regions in this latitude, the lime-stone ridges of Lewiston, Niagara county, New York. I was a small boy when I found a very great variety of choice fruit on my father's farm; apples, pears, peaches, plums, apricots, nectarines, grapes, currants, and gooseberries were grown in abundance. Prior to the completion of the Erie canal we were without a market, and wagon loads of the choicest peaches and plums rotted on the ground; but not long after that time fruit began to be an article of commerce, and as such has continued to increase

in importance as to quantity, quality, variety, and system of handling, until now, when the profits and the pleasure of the business of horticulture have become very great in very many of the States of the Union.

Now as to Barry county: In 1835 Calvin G. Hill settled on what is now the crossing of the two main streets of Middleville, and Henry Leonard about one mile north on the Thornapple river, and the next year, 1836, planted the first apple and cherry trees, each in the same year. About 1837 William Bassett and William Lewis set small orchards in Yankee Springs township; William Bassett sowed some apple seed in 1837, which was the first nursery, so far as I am able to learn, in Barry county.

To condense matters, the first orchard set in Barry county at Middleville was in 1836; Yankee Springs, 1837; Johnstown, 1837; Woodland, 1841; Hastings, 1840; Prairieville, 1839. The first nursery was planted in Yankee Springs by sowing apple seed, 1837, and in Prairieville, 1839. A second nursery set in Prairieville in 1841 was the first grafted fruit planted in the county grafted in the root. These grafts were obtained from Monroe, Michigan. The varieties were the Russet, Baldwin, Spitzenburg, Swaar, Early Harvest and Seek-no-further. Old trees in this county are healthy on the highlands and on clay soil, but on the lowlands and river bottoms the old trees are not healthy, which is mostly chargeable to severe winters a few years since, followed by a series of dry summers.

As to later work, Elisha Kellogg planted two nurseries in the township of Irving in 1844, and sold largely from them for several years. Those nurseries were made up of choice varieties of grafted fruit, but are now sold out and there is no nursery of importance in this county.

First fruit exported from this county was in 1859, by Jephtha Parish, from Yankee Springs, a very fine quantity and quality of Baldwin apples.

We have had no serious destruction of fruit by insects in this county. The codling moths in fruit and borers in trees have done some damage, but no very destructive plagues have attacked the fruit in this county. There is now quite a large quantity of small fruit grown in this county.

CALHOUN COUNTY.

Robert Church, late of the township of Marengo, Calhoun county, settled upon his farm, two miles east of the city of Marshall, in 1836. "One of the first steps taken by this enterprising farmer was to clear off six or eight acres of oak openings and set out an apple and peach orchard." The trees were obtained at Ypsilanti. Soon thereafter he brought from St. Joseph county 300 seedling apple trees to commence a nursery. These trees must have been very small, as he "backed them in." This was the nucleus of the first nursery in Calhoun county, and from it was disseminated the first plantings in what are now large, old orchards.

Yours, etc.,

O. C. COMSTOCK.

EATON COUNTY.

REPORTED BY ESEK PRAY.

J. C. Woodbury, of Bellevue, was the proprietor of the first nursery in the southwest part of the county; Jesse Hart, of Brookfield, in the south part of the county, still living, brought apple seed with him in the fall of 1837, put

them in the ground at once, and raised a nursery, supplying himself and neighbors. Nathan H. Pray (my father), of Windsor, in the east part of the county, in the fall of 1837, located and raised a nursery from the seed, having the seedlings grafted, and supplied many in his vicinity. Jay Hawkins, of Vermontville, in the west part of the county, planted first apple seeds in 1837, and raised a nursery, supplying many of the first settlers in his part of the county. He also grafted pear in thorn bushes, and from them the first pears were raised. S. S. Church and Walter S. Fairfield started the first peach nursery in Vermontville from pits. Orrin Dickinson, of Vermontville, brought seed with him from Vermont for his orchard. The people of Vermontville planted first fruit seed from the fall of 1836 until the fall of 1837. Star Hoyt, of Sunfield, in the north part of the county, sowed apple seeds about the same time, from which many early orchards sprang.

I have not been able to hear of any natural trees found by the first settlers in bearing.

INGHAM COUNTY.

BY GEO. W. PARKS, LANSING.

Agreeable to your request, I have made inquiries and gathered what facts I could in reference to the early history of fruit and trees in Ingham county. The first apple trees planted in Ingham county were set out by David Rodgers, in the town of Stockbridge, in 1835. He built the first house in the county in 1834, and in 1836 he sent to New Jersey and got peach pits. They grew, and were the variety known as Red Cheek Rareripe. Thomas Sill set an apple orchard in the same town in 1836; all were native sorts. A. Standish set an orchard in the same town in 1838; all were native trees but two. One was Yellow Harvest and the other Greasy Pippin. Mr. Law planted an orchard in 1837 in same town.

Among the early orchardists of the town of Aurelius were John Barnes, Robert G. Haywood, Elijah Wilcox, Michael Matteson, H. Roswell, D. Maxson, who planted orchards in the years 1837 and 1838.

The first to plant trees in the town of Lansing was A. F. Cooley, who planted native trees in the spring of 1837. He obtained the trees on the bank of the Grand river near the present location of the city of Lansing. They were subsequently ingrafted with good kinds, and they are healthy bearing trees at this date. Mr. Cooley planted peach trees on same farm in 1844, which bore fruit in great abundance after attaining to proper age, until the year 1855, when they were killed by cold winters; peaches having succeeded only at intervals since, when we have had several mild winters in succession.

The first to plant orchards in the town of Onondaga were the Baldwins and Johnsons, who planted in 1837-8. The first nursery planted in Ingham county was planted in January, 1838, by J. F. Cooley, the ground being free from frost at the time named. The seed was brought from New York. The nursery contained 2,000 native trees, and they were sold to settlers in the neighborhood. James Bignal planted a nursery in the town of Stockbridge in 1850. It was made up of native stocks which were ingrafted in the body three to four feet from ground; they gave good satisfaction to planters. The trees did well and were healthy, and are bearing to date.

Geo. W. Lathrop planted a nursery in the city of Lansing in 1850, he being the first to introduce trees ingrafted in the root. In 1856, J. S. Harris

brought from Genesee county, New York, a stock of apple, pear, plum, peach, cherry, grape, etc.; they were planted on the farm of S. G. Schofield, south of the city of Lansing. In 1857 they were removed to grounds owned by him near the Cedar street bridge, where the stock was increased to 75,000 in all. The trees grew well, and were distributed in Eaton, Clinton, Gratiot and Ingham counties. In 1862 the stock was closed out and business suspended. In the year 1869 Geo. W. Parks planted a general variety of fruit and ornamental trees in the city of Lansing, known as the Lansing Nursery. It was kept up in successful operation until 1873, at which time the Michigan Southern railway company surveyed a railroad diagonally through the blocks, making it necessary to remove it to its present location, one mile south from Cedar street bridge, where it carries a stock of 75,000 trees, and occupies ten acres of land.

The first fruit exported from this county was in 1841, by Robert G. Hayward. There was no great amount of fruit exported from Ingham county until 1873, as the first trees set out were nearly all native sorts, and were not very merchantable. From 1860 to the present time orchardists have been changing their apple orchards by ingrafting market kinds into native tops, which can be done in three years with trifling expense, if properly understood. This is constantly increasing the supply of market winter apples, which promise a large surplus of first-class winter apples for shipment in the near future. It will be observed that the oldest trees planted were native kinds; they were subsequently ingrafted in the body or top. From observation and experience I am inclined to believe that the native stalk is the most desirable for many of our tender kinds of apples. I will name the Rhode Island Greening, Roxbury Russet, and Baldwin, that will grow better on the body of some native or hardy improved stocks like Northern Spy. All the leading varieties of apples, pears, plums, cherries, currants, peaches, grapes and small fruits grow in this county when properly cared for.

The year 1879 was an unusually dry season. Fruits of all kinds were effected by drought. The size and quality were diminished, as well as the yield. The apples were very nearly all injured by the codling moth, as it was difficult to find one but what was worm pierced, even on plates at exhibitions of fruit. The year 1880 will long be remembered in this county as an exceptionally fruitful season. The strawberry first was a success, followed by the black caps and red raspberry, cherries, currants, blackberry, peaches, plums, and apples bringing up the rear part of the season. We can safely say that 1880 has produced more fruit of all kinds, except grapes, than ever before in one season. I will here state that the year 1880 has been an unusually wet season, and the fruit has been of unusually good quality and remarkably free from the ravages of insects.

My first visit to central Michigan was in 1848. Having lived in a well developed fruit country, and having an eye and taste for fruit, my first inquiry was, can fruit be successfully grown here? While some answered in the negative, others answered in the affirmative. It seemed to be a problem to be solved in the future. It is indeed wonderful to see what 32 years of hard work and careful husbandry has done for central Michigan to develop its fruit and agricultural resources. When we look back to our first experiences in this county and take in the prospects of fruit raising for the future, it looked very dubious to an eastern man. The scattering orchards were nearly all native sorts, poor and small. The peach grew in great abundance when trees were planted, but were grown from pits.

But little care was given to fruit trees by the masses; their time was given more to the clearing of the land. Trees were left to be browsed by cattle—unprotected for want of proper fences. I know of parties who planted trees several times on the same grounds on that account. There were many who lived on farms for several years before they planted trees, saying it was too much of an experiment for them to undertake. Ornamental trees and shrubbery were hardly thought of. Where you will see to-day the beautiful ornamented grounds laid out with artistic skill, with walks and drives, dotted with imported and native, deciduous, and every new shrubbery and trees, fruits and flowers, with fine houses and barns, and broad acres in the rear waving with golden grain, 32 years ago might have been seen on same grounds a log cabin, with stumps and logs covering the ground close to the door, with pigs and chickens around the door, no fences to be seen, the jingle of the cow-bells to be heard in the distance. This was not so desirable a picture to behold to a person whose eyes were accustomed to look out upon the matured old home at the east, where fruit, flowers, and all the luxuries of life abounded. Thus we see the mission of the pioneer, an honorable, self-sacrificing mission it is, for he prepares the way for the next generation, which enjoys the fruits of his labor.

ISABELLA COUNTY.

BY HORACE A. BIGELOW.

Our beautiful county of Isabella, located in the geographical center of the Lower Peninsula of the State of Michigan, was, prior to 1854, an uninhabited forest. After the passage of the graduation bill by Congress, August 4, 1854, there was a great rush of land-seekers for Gratiot and Isabella counties. Among that irrepressible throng of the hardy sons of toil was the writer of this letter. October 20, 1854, I entered at the U. S. land office, then located at Ionia, 320 acres of land, being the south half of section three, in Coe township, Isabella county.

In the fall of 1856 I bought 900 apple trees of Mr. Hagerman, a nurseryman living in the town of Blissfield, Lenawee county. These he delivered to me at Maple Rapids, Clinton county. One team could take them no farther north at that time. I sent two ox teams to Maple Rapids for them. From this number of trees five or more different orchards were set, being to-day the oldest and some of them the best producing orchards in this county.

I was fortunate in the selection of these trees, as most of them have proved hardy and well adapted to this locality. The winter fruit was largely composed of the Northern Spy, Bellflower, Tallman Sweet, and Golden Russet. These have proved hardy and well adapted to this climate. Among these 900 trees were a few labeled Virginia Red Streak, an apple quite common in Blissfield, Lenawee county. It is a late fall apple, and, all things considered, is hard to beat. The tree is hardy, producing nearly every year immense crops, and keeps well into January. The first thing to seek for in the selection of fruit is such as has proved itself adapted to the locality in which it is to be placed. Some choice varieties of apples have shown themselves unfit for this section, such as the Red Canada, Baldwin, and Rhode Island Greening. I will mention a few other varieties that I think are well suited to this section. The Wagener, Twenty-ounce, Ben Davis, Rambo, Snow Apple, Bailey Sweet, Early Harvest, Early Joe, Early Strawberry, Fall Pippin, Late Strawberry, Maiden's Blush, Grimes' Golden Pippin, White Pippin, Red Astrachan. We have no

nurseries furnishing fruit trees in our county as yet. There have been no new varieties originated in our county, as I know of. The most vigorous and healthy looking of the oldest apple trees here are the Northern Spy, Golden Russet, Tallman Sweet, and Virginia Red Streak. As to pears, I would say I think the Flemish Beauty and Bartlett the safest and surest here. Plums of most kinds do very well. At the time of writing this, some thirty plum trees in my garden are heavily loaded. Peaches are not reliable here; but what there are here give promise of an abundant yield of fruit this season. Some hardy kinds of grapes, like the Delaware and Concord, do very well in this section.

To all of your questions after the fourth, I would say no.

JACKSON COUNTY.

BY MICHAEL SHOEMAKER.

In reply to your circular of May 21, I would state that the first fruit trees planted in this county were set out in 1830 by Mr. A. W. Daniels, on the farm of his father, Mr. Henry Daniels, in what is now the township of Blackman. The trees for this orchard were sent from the State of New York by Mr. Henry Daniels, who had been "looking lands" through the county in 1829 with a view of locating here with his family, as he did in 1830.

In answer to your second inquiry to "name some early orchardists, with incidents connected with their work," I would report that the Hon. Townsend E. Gidley, on his farm, now in the township of Sandstone, was first both in the extent of his orchard and in varieties of fruit cultivated during the entire time of his residence here. When Mr. Gidley left Jackson county he went to the eastern shore of Lake Michigan, where he made the cultivation of fruit his sole occupation. The largest peach I have ever seen was at Gidley's Station, on the Michigan Central railroad, about the year 1845. Other early orchardists in the township of Sandstone were Amasa Hawkins, Caleb Chapel, Sherman Eastman, Samuel Fassett, John Dearin and Capt. Chester Wall.

In the township of Napoleon, Morgan Case, John H. Burroughs, first to raise apples, brought the trees from Ypsilanti; Simon Holland, Chauncey Hawley, Roswell B. Rexford. Isaac Hatt brought his trees from Ann Arbor, on his back.

In the township of Norvell, Harvey Austin, William Hunt, Aaron Austin, John Hunt, and Perrin Convoxe.

In the township of Columbia, George Stranahan planted first orchard in 1831 or '2; Thomas Lewis, Richard Crego, John Crego, William Gallup, Benjamin Davis, Anson H. Delemater, and Gardner J. Gollen.

In the township of Tompkins, Richard Townley, David Adams, Jesse Ferguson, Walter Ferguson, Gardner J. Gould, and Nicholas Townley.

In the township of Rives, Harry Hurd, Jesse Hurd, John Snyder, Willard Reed, Samuel Prescott, Robert H. Anderson, Alvah True, Ezra Higby, and John S. Trumball.

In the township of Concord, Isaac N. Swain.

In the township of Hanover, Abiel Tripp, William Clapp, James Nash, F. A. Kennedy, Jr., Morgan Buchanan, Daniel Porter, Grinnell Reynolds, J. C. Bell and John Crittenden.

In the township of Pulaski, Michael Nowlan, Luther L. Wood, Warner J. Hodge (brought his trees with him), Sherman Jacobs, Henry Nowlan, John Wilbar, John Weaver and Thomas McGee.

In the township of Grass Lake, Ralph Updike, Benjamin Carter, William H. Pease, J. Keyes, T. Boynton, and A. Soper.

In the township of Leoni, Guy C. Chatfield, Benjamin Welsh, Abel F. Fitch, Amasa M. Barber, Luther F. Grandy, Jacob Cawood and Jacob Sagendorf.

In the township of Waterloo, Aaron Gorton, Patrick Hubbard, Casper Artz, E. S. Robinson, John Barber, and Abraham Croman.

In the township of Henrietta, A. Bunker, Samuel Prescott, A. Hall, W. S. Pixley, and B. H. Pixley.

In the township of Blackman, Henry Daniels, A. W. Daniels, Nathaniel Morrell, J. T. McConnell, J. R. Poole, and S. Z. Crawford.

In the township of Summit, James De Puy, A. McCain, Michael Shoemaker, John Durand, and Dwight Merriman.

In the township of Liberty, S. H. Holmes, Cornelius Cary, Noah Keeler, Michael Kerr, H. J. Crego, and M. W. Crippin.

In the township of Spring Arbor, J. G. Perrine, C. Crawl, A. M. Pardee, H. C. Roberts, G. W. Chapel, W. S. Crawl, Louis Snyder, Jr., J. Belden and Harry Holcomb.

In the township of Parma, Wm. G. Brown, G. R. Davis, N. B. Graham, J. D. Mackey, F. F. Richardson, and J. Taylor.

In the township of Springport, W. H. Hammond, H. Fitzgerald, W. S. Brown, James M. Jameson, O. V. Hammond, G. Landon, S. H. Ludlow, S. O. Gillett, and G. T. Griffith.

The foregoing is compiled from the best sources of information I have been able to find. It is more than probable that some of the early orchardists in the county are not named.

I can learn of no earlier nursery than that of the Hon. Townsend E. Gidley. Morgan Case, of Napoleon, planted apple seeds in 1832, raised a nursery, from which the trees were obtained for many orchards now in bearing. Luther F. Grandy had a nursery in Leoni at a very early day. Benjamin Welsh, of the same township, also had a nursery.

Isaac N. Swain, of Concord, had a nursery among the first in the county. Harmon Landon established a nursery in Springport soon after settling in that township. Morgan Buchanan planted a nursery on section 33, township of Hanover, soon after the settlement of that township.

Mr. — Cook had a nursery for many years on his place, now in the city of Jackson, of all kinds of fruit trees. I. M. Harwood and Richard Dunning had an apple nursery on the farm of Hon. James C. Wood, commencing some time about 1855. They also had a nursery on their own place in the city, on which they had all kinds of fruit and ornamental trees suitable to the climate of this State.

PEACHES.

Peaches have always been raised in this county from its first settlement. There never was failure, or injury to the trees or fruit until January, 1854, when all the trees in this county were severely injured or killed by the extreme cold weather. Since that time the crop has been an uncertain one, but there have always been orchards of greater or less extent. The largest orchard ever planted in the county was on the farm of M. Shoemaker, in the township of Summit. It was planted by Harwood & Dunning with varieties from their nursery, and bore many crops of most excellent fruit. This orchard was planted in 1855 and 1856, but no longer exists. There is now a growing

interest in the cultivation of the peach in this county, particularly in the southern portion of it, and peaches are now in the Jackson market from the vicinity of Brooklyn. Mr. Dwight Merriman, of Summit, is quite a successful grower of peaches. He has also extensive orchards of all kinds of fruit raised in this latitude.

Peaches were shipped from this county full thirty-five years ago, and apples thirty years. The exact time I cannot give.

There has been no destructive visitation of insects, but apples and plums have suffered somewhat; but I cannot, for want of time, ascertain and give particulars.

There is now a horticultural society here, formed within the past year.

The shipments of fruit can be ascertained from the books of the railroad company, but to do so would take more time than I can devote to that point. The shipments of apples from this county have amounted, however, to many thousand barrels for most of the years for twenty-five years past.

KENT COUNTY.

The very earliest history of horticulture in Kent county is connected with Grand Rapids as a French trading post. Louis Campau, previous to 1834, had improved a piece of land extending from the present site of the Rathbun House on the corner of Monroe and Ottawa streets, to the Eagle Hotel, and from thence to the river bank. This was a vegetable and flower garden with shrubbery and trees scattered through it and a few fruits. The most attractive thing about it was the flowers, and it was a place of resort for whites and Indians. The latter used to land from their canoes and go up through the garden by a well trodden path to Mr. Campau's house. An old canoe answered for a propagating bed in which to start things before they were planted in the garden.

About the year 1835, Mr. Abel Page moved to Grand Rapids and located on the bank of the river near the foot of Huron street. Mr. Page and John Almy, his nearest neighbor, started gardens upon the bank of the river, and planted in them such things as they brought from the east and could get through the mails from friends, in the form of seeds and slips. They also made some selections from the woods. It was in Mr. Page's river garden that the first tomatoes were raised in the Grand River Valley. They were a great curiosity, and grown as ornamental plants and called "love apples." There was but one person in the country that would eat them, and that was the school teacher. This was a matter of astonishment to the people, and at first dire consequences were expected as a result.

For a good many of the first things planted in the gardens of the settlers, they were indebted to the kindness of Uncle Louis Campau, who grew nothing to sell, but gave many things away.

In 1838 Mr. Page moved up on Bridge street hill and planted another garden with a sort of nursery attachment, the whole occupying perhaps three acres. This was the year of the great flood in the river which occurred in February. It was in this second garden that Mr. Page grew *Morus multi-caulis* and raised silkworms, dealing in the cocoons. It was about this time the Rohan potato had such a great run. Mr. Page raised specimens that would weigh two pounds and sold them for seed at the rate of from \$16 to \$20 per bushel. The fruit in this garden was grown largely from plants found in

the woods. Mr. Page and his sons gathered gooseberries, currants, raspberries and blackberries, as well as plums, from the valley of Grand River, and by careful selection succeeded in growing very fine smooth gooseberries of large size; black caps were grown that rivaled the cultivated sorts in size and quality; white blackberries were found and propagated, and plums were found, large and delicious, that ripened as early as August. All these added to slips of cultivated fruits and ornamental shrubs, made the nucleus of the future nursery.

The first apple seeds planted were from fruit gathered from the old French trees about Detroit and shipped to Grand Haven around the lakes, and from thence up the river in Mackinaw boats. The apples were eaten with the understanding that the seeds should be saved, and no guest was treated to any of the fruit without this proviso being put in. A quart of seeds thus obtained were sown; at the same time a bushel of peach pits were planted, producing trees that were sold readily without budding at good prices.

Mr. Page grew the wild cranberry here, and his garden was a resort of people who wished a feast of fruit. He also raised about the first melons grown in the country.

It might be well to speak of the nearest attempt at gardening outside of Grand Rapids. As early as 1835-6, "Yankee" Lewis had a nice garden at Yankee Springs, in the edge of Barry county, and people coming through from Kalamazoo were delighted with his thrift and good taste. Upon the site of this garden are now located orchards containing over 4,000 trees, in a very prosperous condition.

Really the nursery business proper, in Kent county, was started by Abel Page and Sons in the year 1845. It was planted north of Coldbrook, and the first 10,000 root grafts were purchased at Monroe, of one Hartwell, a nurseryman there. Two-thirds of these were apples, the remainder divided between pears, cherries, plums, etc. To these more were added rapidly, until in two or three years the number of trees in the nursery reached 250,000, and for nearly 20 years about this amount of stock was carried.

In 1850 the first mammoth pie-plant root was brought into the country, by the father of John B. Colton, in a pot swung under his wagon. From this Mr. Page secured a slip for one dollar, and the next year sold five dollars worth of plants from it, and two years thereafter sold Judge Withey enough pie-plant for Independence day's dinner, for \$2.00.

The first Lombardy poplar was brought into the country by Samuel White, and planted near the head of Stocking street. From this slips were taken to stock the Coldbrook nursery. When getting the first nursery stock at Monroe, Mr. A. T. Page secured a quart of seed from the common yellow locust. This was planted, and from this seed in a few years, over \$2,000 worth of trees were sold.

A few trees of the very best sorts were imported from Hodges' nursery at Buffalo, by Page while he was starting his nursery. These were most of them sold again, but a few were retained and planted out in the nursery grounds from which to get grafts, and to use as an advertisement for the nursery as they came into bearing. The first fruit thus grown was very precious, and preserved with the greatest of care. The first trees sold were seedlings, and customers asked no questions. They were glad to get anything of fruit tree kind, but as soon as the first grafted trees bore, more anxiety was shown in getting good varieties.

The root grafts bought by Page were some of them sold at three years of age, and distributed through Kent, Ionia, and Ottawa counties.

In about 1855, Hiram Rhodes established a nursery on the river, just below Ada, and H. N. Peck started about the same date in the town of Grand Rapids. The Kellogg nursery was started a little later on the hill between Fountain and Fulton streets, and was afterwards purchased by George Nelson. As soon as the Detroit & Milwaukee Railroad was completed to Grand Rapids, nursery stock, the refuse of eastern nurseries, was shipped in to Grand River country, and sold at rates far below what the stock could be grown for here, and hence the business was gradually dropped. Soon after this the Husteds started near Lowell, and ran a large nursery business until 1873.

In 1836 Mr. Robert Hilton came to Grand Rapids, and the only two orchards started that were talked about then, were those of Burton, in Paris, and Chubb, at Grandville. Mr. Hilton's farm was in Walker, and in 1840 he planted 50 apple trees about forty rods from the river. In 1845 he planted 300 more grafted apple trees, purchased of Geo. Barker, who had a small nursery out on Bridge street west, near city limits, and of a small nursery that stood on the south of Monroe street, near the site of Aldrich's block. The orchards are standing now, and before Mr. Hilton left them, in 1848, some of the trees bore well. From two trees of the Fameuse variety, he took one year (probably 1848), twenty-one and one-fourth bushels. He grew peaches on the land near the river, and in those days the locality seemed very free from frosts, even more so than the higher ground.

The towns of Caledonia and Bowne were originally one, and the very first trees taken in there had a very interesting history. Mr. Reuben H. Smith, in 1840, was returning from a trip outside the county by way of the Grand River crossing at Lyons, and as he came to the ferry he found a man standing disconsolately with a bundle of seedling apple trees beside him. While arranging to go across with the ferryman, he inquired of the stranger what was the matter, where he was going, etc., ascertaining that the man was entirely out of money, and could not pay his way across the ferry, and was on his way to Ionia, hoping there to dispose of his trees for a little cash. Mr. Smith had compassion on the man and paid the fee taking him over the ferry. The man expressed great obligations, and as they walked on toward Ionia together, they talked apple trees, prices, etc., and finally struck up a trade, the result of which was that Mr. Smith took the bundle of seedlings into Bowne. These trees were mostly planted by Asa and Loren B. Tyler. Charles N. Foster and Wm. A. Beach were then little boys, and each was given a nice straight seedling for his own. Foster's tree bore first, and in 1863 it was reported as bearing above ten bushels of fine fruit. These two trees are now living and bearing regular crops.

Frederick Thompson and Isaac Wooley set some trees out on what is now known as the Jonathan Thomas estate, as early as 1837, and a Mr. Kent planted seedling apples about the same time. In about 1840, Peter, John, Malcolm, and Daniel McNaughton, and John A. Campbell planted out seedling orchards in the same township.

Paris and Gaines were originally one township, and the very first trees planted in this town were on the Barney Burton place, now known as the Garfield farm. Mr. Burton started a seedling nursery here, and furnished a good many trees to the early planters in his own town. Mr. S. S. Buck, on section 34, set an orchard from this nursery in 1844.

About 1840, A. L. Bouck had a small nursery on what is now the line between Paris and Gaines, on the old Kalamazoo road. As early as 1838, Foster Kelly and Mr. Blaine brought peach trees from Orleans county, New York, and

planted in this township near where they now reside. J. W. Woolcott, in this town planted seedling apple trees in 1843, and grafted them in the top. Robert Jones was an early planter in this township, and brought his trees from Adrian, while the Brewers secured their first nursery trees in Ypsilanti. There is now a small nursery in Caledonia, on section 36, owned by J. B. Proctor & Son.

About the time that Mr. Bouck and Mr. Burton had their nurseries, Mr. Godwin, in Wyoming, started quite a variety of trees on the new Kalamazoo road, which was well patronized; remains of the nursery are yet standing on the place owned by Augustus Godwin. S. M. Pearsall is supposed to have planted the first orchard in the town of Alpine; he brought the trees from Troy, Oakland county, in 1843. They were brought in wagons, and cost him when planted, about one dollar apiece. Mr. Pearsall brought into the country, from Avon, the White Astrachan, or as he then called it, Transparent Moscow. Very soon after this Mr. Noel Hopkins planted his orchard in Alpine.

One of the very oldest apple trees in Kent county stands in the garden of the writer (Chas. W. Garfield), planted by Barney Burton; the body of which is five feet in circumference three feet from the ground, at a point below the enlargement caused by the branches. The top has spread nearly fifty feet, but recently has been shortened in.

The nursery interest of Kent county received a severe shock from the hard winters in the first half of the past decade, but now is recuperating again. As nearly as can be estimated the acreage is as follows:

J. D. Husted, Lowell.....	15 acres.
N. P. Husted, Lowell.....	12 acres.
Munson & Knapp, Grand Rapids.....	30 acres.
Thibos, Lewis & Co., Cascade.....	15 acres.
Wm. Watson, Cascade.....	5 acres.

Since 1870, the heights of ground in Kent county, especially in Gaines, Paris, Grand Rapids, Walker, Alpine and Sparta, have been planted to peaches, and the success has been all that could be asked. As yet there has not been an authenticated case of the yellows.

MACOMB COUNTY.

PREPARED BY J. E. DAY OF ARMADA.

Owing to the meager amount of information I have been able to gather in reference to this subject, I can but make the introduction, hoping that some one will complete it next year.

The first tree-planting in the county of Macomb was upon the banks of the Clinton (then Huron) river, in the vicinity of Mt. Clemens, nearly or quite one hundred years ago; probably by the Moravians, who had moved from the Muskingum in Ohio. These first trees, some of which are still standing, show marks of great age, are of very large size, and of a kind of fruit with which the orchardists of the present day are not acquainted. At or near this time, a family by the name of Tucker settled on the Huron, and undoubtedly planted fruit trees. No very decided steps toward a supply of fruit were made however, until after the war of 1812, when, as the country began to open, and settlers to come in, seeds of the apple and pear were planted, and the seedlings set out about the house for an orchard.

In the south-west portion of the county, orchards were set out first by a Mr. Squires, about 1825, and a little later by Mr. Arnold, and a little after by Lazarus Green, a Quaker, who settled in the township of Washington in 1822 or 1823. Mr. Green had for a long time the largest orchard in the county, and was somewhat noted as a fruit raiser. He went about the county grafting at an early day. In the northern portion of the county the first planting was done by Mr. Asabel Bailey, and at about the same time by Dea. Rogers, Gad. Chamberlin, Mr. Gates and others. Mr. Ira Phillips was also an early fruit raiser. After the year 1830 settlers came in fast, and each provided in some way for a supply of fruits. Many brought seeds with them, while others found in the woods little seedlings growing in places where Indians or hunters had camped when on some expedition. The largest orchard within the county, known to the writer at present, is situated near the village of Richmond, and is owned by Mr. Canby. It covers 20 acres of land, and contains about 1,200 trees of the best varieties. One of the most thrifty, and apparently most profitable orchards is that of Mr. Chas. Perkins, near Richmond village. This orchard is situated upon a sandy ridge of land inclining to the south, is rich and always dry. The smoothness of the trunks, the vigor of growth, and the size and fairness of fruit in this orchard are wonderful. Mr. Perkins has only a few of the best known varieties, which he strives to improve by good culture and judicious training, and lets others experiment with new varieties.

Peaches and the smaller fruits are not cultivated to a large extent, but it is the aim of many farmers to provide a succession of fruits for their own consumption, from the strawberry to the early and late apples. Prominent among the cultivators of the peach, is Mr. Loren Andrews of Washington, who has an orchard of 1,200 trees, bearing this year (1880) about 300 bushels. 1,600 old trees have had their time and are being removed. Many smaller orchards are located in various portions of the county, along the ridges of land.

The secretary of state, in his report for the year 1879, reports the number of acres in orchards:—apple, 5,458 acres; peaches, 700 acres; bushels sold in 1878—apples, 148,330; peaches, 1,004 bushels.

It will be observed that the yield per acre is very small, only a trifle over 27 bushels; at 50 trees per acre, a little more than one-half bushel per tree. This is explained by the fact that more than one-half of the orchards in the county have not yet come into bearing. From five to seven years ago a large amount of trees were set, both to replace those beginning to decay and to increase the amount of land in orchard. In respect to quality of fruit, Macomb stands "way up." The varieties are standard and the fruit excellent. The only discouraging feature is that a good crop gluts the market, and no outlet is found for it. No. 1 apples of standard kinds are to-day begging for buyers at 15 to 18 cents per bushel.

Since writing the above I have received a letter from Mr. Green, son of the Lazarus Green referred to in my article, which I copy entire. He says:

As near as I can calculate from recollection, the first two and one-half acres of the twelve of my father's orchard, were set in the spring of 1827, the balance in 1830. They were trees from a nursery of his own raising, started from roots brought in a box from Genesee county, N. Y., in the spring of 1822. A considerable share of the old orchard was set with a sweet apple, a great favorite of my father, called by him the "Rhode Island Slug Sweeting." I find no such name in the books now, but it answers to the description of the Jersey Sweeting exactly. My father was something of a fruit fancier in his day. Kept a nursery some 15 or 20 years, from which hundreds of orchards in Ma-

comb, Oakland and Lapeer counties were supplied. Our orchard was first set with natural fruit and the "Slug Sweeting." The latter my father claimed was a cultivated variety, both root and branch alike. He evidently considerably over-estimated its qualities, yet for cider, for feeding, or as a stock upon which to work other varieties, it was superior. The Spitzenburg, for instance, grafted upon it was improved 100 per cent. Four or five years after the orchard was set it was grafted in the top, and in many cases where the trees were small, on the stock, cut off three to four feet from the ground.

I think my father had the first peach orchard in that part of the county, planted from pits in the year 1825, the red and yellow rare-ripes and some fine later varieties.

MANISTEE COUNTY.

BY S. W. FOWLER.

This county is comparatively new, having been settled but about thirty-five years, and as lumbering has been the principal business of its inhabitants until within the last six or eight years, farm interests were formerly sadly neglected. The county is well located in the center of the great fruit belt of Michigan, is well adapted to fruit growing, and is probably one of the very best locations in the world for plums, pears, apples, peaches and small fruits.

The deep water of the great lake (Michigan), which is never frozen over, give off warmth in the fall, so that there is no early frost to injure anything, and the cold is kept off nearly two weeks later than in the interior of the State; also in the spring the cold water of the lake prevents buds from starting early, and frost never injures fruit, besides the soil and climate seem wonderfully well adapted to fruit culture.

The first fruit trees were planted in the county, in 1849, by James Stranoch, Sen., in a small place known as Old Stranoch. Some of the trees yet remain near the first framed house built in the county. Mr. Stranoch only planted a few trees around his house, as he was a lumberman.

Robert Ridsen planted the first plum orchard in the county about the year 1869. He planted two acres, and the orchard is yet the best plum orchard in the county, and yields a revenue of about four hundred dollars a year. The plums are splendid, and are not troubled with curculio. Later, D. L. Filer & Sons planted over 3,000 peach, plum, and other trees, which yield them now a large revenue. Others have planted orchards, until now there is a young and thriving orchard on nearly every farm in the county, all doing well, and yielding profit and pleasure to the fortunate owners.

THE FIRST NURSERY

was started by James M. Fairbanks on his homestead in Bear Lake, in 1868. He sold trees for several years, and then died. Since his death no one has engaged in that business in Manistee county, although it is one of the best locations in the State for that business.

The first fruit exported was from the orchard of D. L. Filer & Sons, and about the year 1876. They have shipped peaches and other fruit quite largely each year since, but owing to the fact that there are over three thousand men, many of them transient, employed about the mills and in the woods in the Manistee region, Manistee is the best home market in the world for all kinds of fruit and vegetables.

No insects have ever yet troubled the fruit in this region to any serious extent.

There has been no purely horticultural society in the county, though we have an excellent county agricultural society.

Manistee raises more and larger strawberries than any region I know of. There is frequently as high as three hundred dollars cleared from a single acre in one season.

In 1880, S. Rice marketed 3,354 quarts picked from one acre of land. The average price was ten cents per quart—\$335.50. Chas. Hurd, John M. D. Heath, R. Barns, and many others, have done about as well.

Manistee has direct steamboat communication daily with Chicago and Milwaukee, making this a desirable shipping post. Lands, good for fruit and farms, can be had for from five to ten dollars per acre, and we confidently expect that the day is not distant when all this region will be largely devoted to furnishing fruit to the large cities and non-fruit-bearing regions of the west. Already Manistee fruit has taken the first premium at the State fair whenever well represented. R. Barns has taken the first premium on peaches; L. S. Ellison, plums and peaches; S. W. Fowler, on plums and peaches; Wm. Probert, on apples; and others have been equally successful.

Manistee as a fruit region needs but to be known to be appreciated, and the thanks of her people are due to the State Pomological Society for hearty coöperation and support.

MONTCALM COUNTY.

BY JAMES SATTERLEE, GREENVILLE.

A large portion of Montcalm county is still too new to show any great advancement in fruit-growing. The southern tier of townships which join Ionia county on the north, Eureka, Fairplains, Bloomer and Bushnell, were the first settled, and show the greatest development in fruit culture of any township in the county. The original timber of these townships was mostly oak, in some parts very heavy. It has taken much time to get rid of the stumps and to get good orchards started. The timber of Eureka being less heavy was the first cleared, and this township now produces more fruit than any other. There is much high, dry and sandy land well adapted to peach-growing. In the early history of the township peaches never failed. Of late years the crop has been more uncertain. Cherries, pears and grapes are grown quite successfully. The first apple orchards were set in the spring of 1845 by W. and R. K. Divine. A year or two afterward Alexander Satterlee set a fine orchard, and orchards were set by Ethan, Henry, and Ezra Satterlee. These orchards are all in good bearing condition, only a few trees being killed in the severe winter of '74 and '5. Many younger orchards are now in bearing, and the fruit produced is of the very best quality.

Fairplains, lying east of Eureka, has many good orchards, the first of which was set by J. Bradish, about 1850. Nearly the entire township is good, strong soil, and the land quite level. But few peaches are grown. The same may be said of the two townships lying further east, Bushnell and Bloomer. The soil is strong and well adapted to growing apples.

These four townships produce nearly the entire fruit crop of the county. Lying so near the lumber woods and the newly settled portion of the county, the market is always good.

A large portion of the other sixteen townships was covered with pine forests, some of which still remain. Many of these forests were interspersed with beech and maple and oak timber, some quite large tracts being entirely covered with beech and maple. These tracts are generally level land on which fruit trees do not as yet seem to thrive well. As the country becomes older and the farms are underdrained, apples will doubtless be a successful crop throughout the entire country. Orchards are doing better on the high, rolling lands, even where the pine timber has been removed, than on the level lands from which the beech and maple have been cleared. The severe winter of '74 and '5 killed or severely injured all the young orchards of the northern part of the county. Trees that survived seem to be recovering from the effects of that winter, and all young orchards set since are making a strong, healthy growth.

A part of the township of Montcalm, lying north of Eureka, has good fruit lands, and some of the apple orchards are doing remarkably well. It is a noticeable fact that the heavy oak timbered land, having strong soil, has been the best adapted to the growing of apples. The trees are healthy and long-lived.

Sidney, lying east of Montcalm, has some good lands for orchards, but is yet quite new, with but few bearing trees, and the same is true of the townships further east and north.

In Crystal, Chauncy Case has a good bearing orchard. In Ferris, David Eschliman has a good variety of bearing trees, including peaches, pears, plums and cherries. Christopher Hare of the same township has a fine bearing apple orchard. In Richland, Mr. Merry has a good orchard, and other orchards are getting a good stand.

John Riches probably has the best orchard in the township of Cato, and Isaac Gilleo of Winfield has a good orchard. The high, rolling, timbered lands of these two townships are well adapted to all kinds of fruit, and many young orchards are doing well. In Maple Valley, R. N. Wright, Elias and James Ferguson have good young orchards, just coming into bearing. This township has a great deal of strong, rich land, and is well adapted to the growth of fruit. The same is true of the township next west, Pierson. John and Owen Pierson were the first that planted orchards in this township, and now have good, healthy, bearing trees. Young orchards are being started that are very promising.

In Reynolds, the north-west corner township of the county, John Moore has the only good bearing orchard, and there are but few desirable locations for fruit raising in the entire township.

But little has been done with the raising of small fruits and berries in the county, there being usually such a supply of wild blackberries in the newly chopped pine forests, that there is no inducement for the cultivation of such fruits. Strawberries and raspberries do well however, and enough are grown for home consumption.

We consider the future of fruit growing in Montcalm county as very promising. Being near the northern limit of successful culture in the interior of the State, our market will always be good. Good varieties have usually been planted, and the quality is always of the best.

SAGINAW COUNTY.

BY E. F. GUILD.

In reply to the questions proposed in your circular, I shall have to vary somewhat with the answers. Abram Whitney set out the first orchard in the fall of 1833, on section 18, town 12 north, range 3 east, that was set by a white settler in this county, although there were apple trees which had borne large crops of apples at that time on the banks of the Tittabawassee river, and the banks of the Saginaw river and its branches were lined with wild plums, which were eagerly sought for by the early settlers and the Indians. Of the date and origin of the Indian orchard (so called), on the banks of the Tittabawassee river, little can be said, and accompanying this response I will send a report written by Robert Ure, one of the oldest residents of Saginaw. Harvey Williams, in the fall of 1835, bought apple trees at Judge Sprague's nursery, at Chipman's corners, 13 miles east of Pontiac, from which Gardner Williams, E. F. Williams and himself set orchards. Geo. F. Williams, Hiram L. Miller and Norman Little all set out fruit trees the same fall. On or before 1833, Col. Stannard set fruit trees on the place now owned by David Benjamin. In 1834 Whitney also set out an orchard on the Parker place. Groover Vinton also set an orchard on the McCellan farm, and Duncan McCellan set out trees on the Pruizer farm, all bordering on the Tittabawassee river, in Saginaw town. This comprises nearly all, if not quite all of the earliest orchards in the Tittabawassee district. Charles A. Lull planted trees in 1835, also Phineas Spaulding and Mr. Vaughn the same year. Phineas Spaulding planted seeds of apples and in five years they produced fruit. Most, if not quite all of the above trees were natural fruit, none being grafted. In the towns of Taymouth, Frankenmuth, and Montrose, Genesee county, along the banks of Flint and Cass rivers, were many Indian settlements, in which were many apple trees, which bore large crops of fruit, some of which was of good quality, while grapes and plums grew spontaneously upon the low grounds adjoining the rivers; also the same along the banks of the Cass and Shiawassee rivers within the limits of the county, and it would not be preposterous to presume that those orchards or trees, as there were only a few trees in a place, originated in the same way and about the same time as those on the Tittabawassee river, of which a full history is given herein.

In the fall of 1843, D. D. Ross settled in the town of Taymouth, and John Ferguson in the town of Montrose, Genesee county, on the banks of Flint river, and in what was called the "Indian Fields," where were several apple trees, which were full size and bore large crops every season of beautiful fruit. These trees bore so well, and gave such an abundance, together with the difficulty of obtaining trees, that no orchards were set out by the settlers for several years, they depending on these and the bountiful supply of wild plums, grapes, and other native fruits, which grew along the borders of the river at this time. In 1848-49-50, there was quite an emigration to the county, and a number of orchards were set out in different parts. Messrs. Ross and Ferguson, together with their neighbors, obtained trees from the Bliss nursery on Flint River, about five miles below the city of Flint, and set out some orchards. A. K. Penny and C. W. Grant of East Saginaw set out some trees at this time, together with several others. Wm. F. Glasby set out a few peach trees, which were probably the first that were set out in this county, and he also set out an orchard of grafted fruit, which was probably the first there was planted. This was in

the spring of 1850. From this time settlers came in and cleared up their farms and set out trees of all kinds, but the wild or natural fruits were so plenty along the river banks that settlers were negligent about setting out fruit trees at first. No nurseries have been established within the limits of the county, and none of the trees have been imported from that hot bed of nurseries, Rochester, N. Y. The tree peddler has enjoyed the full scope of the country, and has scooped and humbugged the people as he pleased, with no one to interfere, and among the special vanities and one of the largest humbugs ever imposed upon the public was the introduction of the California grapes. They are very prolific and nearly everybody has them. They are red, white and black, and get ripe at all seasons, and some do not get ripe at all. The fruit interest has not been a very prominent one in this county until within a few years. Salt and lumber predominating, every other interest had to succumb and give way to those.

But when the panic of 1873 came, people began to see that agriculture was the basis of our whole system, and horticulture, being a part of that system, began to look up. As the settler cleared off his place and made a place for his buildings, he began to think of his fruit. He could go into the neighboring fields and pick berries of all kinds, but apples, peaches, pears and grapes did not grow spontaneously, and for those he would have to wait. Peach stones, plum stones and grape seeds were planted and trees were grown, and it would be strange if soon new varieties were not propagated which are worthy of a place in the great catalogue with which we are blest or cursed as the case may be, but as far as we have been able to learn, none have been originated which have been disseminated outside of the county, although we have several very promising varieties. Until within a few years Saginaw has imported nearly all the fruit that was consumed, and at the present time more fruit is consumed in the two cities than is raised within the county, but if we are any prophets, this state of things will not last many years longer. The Saginaws have the reputation of being one of the best fruit markets in the State, consuming a large amount and producing, it might be said, none. The interest in connection with agriculture is now developing very fast, and the time is not far distant when fruit of all kinds will be exported in large quantities, both green and evaporated, and as the interest grows, horticultural societies will be formed, where people can meet, discuss and learn how to grow two apples or grapes where one is now grown, and how to destroy two or more insects where one is now destroyed. But in a section where one or two interests predominate they destroy all others. Along the banks of the several rivers, the Saginaw and its tributaries, grapes, plums and all kinds of berries have grown in luxuriance and abundance, and even at this date in many neglected and desolate places these can be found. All the native nuts can be found in abundance. These are indigenous to this climate, showing conclusively that for raising choice fruit of any kind that will grow in this climate, Saginaw cannot be excelled by any part of the State, and this State certainly cannot be excelled by any State in the Union, as has been fully demonstrated on several occasions, and at several national exhibits.

THE OLD INDIAN APPLE TREES.

Robert Ure has kindly furnished the following concerning the Indian apple trees of Saginaw county:

The seeker in the pomological and horticultural history of Saginaw county will find an extensive field before him, as he enters its undefined limits and

undertakes the task of setting in due order an outline of probabilities as regards dates, and a task that will require no little ingenuity in tracing to their sources the various varieties of fruits, large and small, which were found in comparative abundance in the first thirty years of the present century. I cannot undertake to say anything upon this subject except what relates to the Tittabawassee river, my knowledge of the fruits growing in other parts of the valley being so limited as not to permit me even to make a guess as to what may or may not have been done or discovered in the other parts.

The statements I may make will be principally from my own recollection, the accuracy of which I shall try to make accord with the recollection of others.

I do not know that there were any Indian apple trees on Green Point, but clumps and clusters of wild plum trees were found along the Tittabawassee above its junction with the Saginaw, and almost every fall canoe loads of red and yellow plums could be gathered, and the supply was always more than equal to the demand. The first apple tree to be met with, passing up the river, was near the Briggs house, of which I can say but very little. The first of any importance were on the James Frazer farm, not only because they were way marks along the river and at a convenient place for getting out of the canoe to stretch the limbs and rest a few moments in their shade, but more especially for their being forcible reminders of the civilization that had been left so very far in the rear, and enormous crops some of them produced. Several have been known to produce eighty bushels of apples on each tree in a season. A semi-wildness in their cast and complexion, and still more so in their taste, the atmosphere that settled around them while they were ripening in the autumn months intensified; the lazy smokes from hundreds of wigwam fires scattered along the river banks had something to do in giving that peculiar luster of complexion so characteristic of the fruit of the Indian orchard of fifty years ago. The apple trees near the State road bridge were thrifty growing trees, and some of them had beautiful appearing apples, one of them bearing a very rich red apple, of good size, but oh, how sour! The next were on the Span farm, now occupied by the Tittabawassee Boom Co., and were a little ways back from the river. One or two of these bore very good fruit. The next were at Aptewatchwon, or half-way to what is now Midland City. There were quite a number of trees at this place, some with very inferior fruit, and others very fine and good keepers. These trees grew on the Indian reservation, and after it was sold to the government some of the trees were taken up and transplanted by settlers on their own lands, but previous to the sale the Indians had the sole right to the product of these trees, known as an usufructuary right which ceased when purchased by the actual settler. The Indians were in several instances allowed by the purchasers of these lands to help themselves to the apples growing upon those trees, they claiming that they remembered when they were little children how they assisted their aged parents in setting out the trees, and as it is taken for granted by some that Indians never lie, and the word "Kewenim" could never find a lodging place on the Indian side of the question, so no one ever thought but that the settlers were simply doing as they would be done by, and so were commended by their neighbors for their generosity. Since I have been looking up this matter and making inquiries, I believe that the whole history of these trees has been unknown so far as truthfulness is concerned. In the first place I do not believe that a single tree was bought of a tree peddler or nurseryman, neither do I believe that the seeds from which these trees grew were ever planted by Indians.

Within the recollection of the old residents, the Saginaw Indians made an annual journey to Malden, Canada, to receive presents from the British government, and these journeys were generally made by way of the Indian trail, accompanied by their ponies and dogs, while the poorer "Nitches" went in canoes, following the shore from Saginaw to Detroit. The orchards, both on the Canada and American side of Detroit river, bore large crops of fruit, and the Indians, who were proverbially hungry, without doubt often filled themselves with the tempting apples. It would be nothing strange if some were put away among their baggage, and when brought back in their canoes, there being bearing apple trees at that time on the trail as far as Pontiac, a few might possibly have found their way to Saginaw by this route. The improvident nature of the Indians will not permit us to give them any credit of ever carrying apple seeds any distance with this design, that after waiting ten or fifteen years they would have the enjoyment of eating the fruit of them. Much sooner would I believe that the seeds from which their trees grew were transported in the stomachs of those journeying Indians than any other way, as they were in more ways than one bipeds of passage. My reasons for these conclusions are

First, These apple trees do not have the appearance of ever having any care taken of them;

Second, The fruit resembles the apples of the old French orchards on the Detroit river in their appearance and quality;

Third, The Indians, who were too indolent to build good shelter to protect themselves and families from the inclement weather, might plant a little corn, when but a few weeks would intervene between the planting and the green-corn dance, but nothing that I have ever seen in the prudential motives of the Indians of former days could induce me to believe that the combined forethought of the whole Saginaw band or tribe would ever amount to the setting out of an apple orchard. I conclude, therefore, that the seeds from which these trees grew were carried to their respective locations in the stomachs of the Indians in their migrations from place to place, and after being discovered were, without doubt, in some measure protected by the squaws, who are the laboring class of the tribe, until their growth was assured.

The exact date of the first bearing apple tree of the Indian orchard is impossible to state here, but it would not be among the impossibilities to presume that it was some time previous to 1800, as there are several squaws and Indians whose recollections go back distinctly to the war of 1812, and at that time there were many apple trees which were full size and bore large crops of fruit every year. This would at least bring their origin previous to 1800 several years or more, and it is not at all unlikely that there were seeds deposited, and trees grown from them, as far back as the middle of the eighteenth century. The naturally fertile soil along the river banks in Saginaw county seems by these facts to be the native home of all kinds of our native fruits, where they will grow in luxuriance and abundance, and repay the grower in ten, fifty and one hundred fold for his labor.

VAN BUREN COUNTY.

BY A. C. GLIDDEN.

Michigan begins to feel the weight of years. Its older portions are just realizing that they have an unwritten history. Incidents and matters of fact, recognized at the time as of slight importance, are now becoming historical.

Old clocks and old crockery are heir-looms. Even the spot where the first shanty of the pioneer stood is consecrated ground. Gray haired veterans recount their early exploits with pardonable pride as they swing in hammocks in the ample shade of the trees they planted. A few years more, and they who planted the seeds of our earliest trees will be laid beneath them. Hammocks will swing, children will laugh in the shade, strangers will eat of the fruit, but the memory of him who planted the tree will fast fade away. It is very appropriate that these items shall now be gathered.

The pioneers of our county came principally from New York and New England. They came to make homes. They "came to stay." They had been accustomed to the use of fruit, and they thought that nothing would conduce so much to the comforts of their new homes as the fruits they were familiar with; so they, in many instances, brought with them seeds and cions. The first apple seeds planted in the county was in the spring of 1836, by John Lyle, sen., brought by him the fall before from Utica, N. Y. They were planted on the farm now owned by T. Adriance, northwest of Paw Paw, near the southwest corner of the farm, adjoining the road. Only a pint of the seed was brought, and a part was reserved for the next spring's planting, fearing lest some change of climate might destroy it all. The balance of the seed was sown in the spring of 1837, across the road, west, on the farm now owned by Thomas Tuckey. Mr. Lyle was not a nurseryman, and he let his son-in-law, Edwin Barnum, have a part of the seedlings, which he transplanted to his farm, or clearing, west of the village; and George Smith, a tailor of Paw Paw, who knew something of grafting, had some of them.

In the spring of 1838 James Lee came in from Ogden, Monroe county, New York, and brought with him cions of several of the then well-known varieties, and most of the older orchards now have some of those old varieties, viz.: R. I. Greening, Seek-no-Further, Spitzenburg, Spice Sweet, Roxbury Russet, Big Stem Harvest, Holland Pippin, Early Harvest, Swaar, Twenty Ounce, Sweet Bough, Cheesboro' Russett, Redstreak Harvest, and Ox Heart. These cions were divided between Smith and Barnum and grafted on their seedlings,—Lee receiving one-third for the cions.

Joshua Bangs came to Paw Paw in 1836, sent back to Monroe county, New York, for some apple seeds, and planted them in the spring of 1837. He had learned to bud and graft before leaving home, and was the first to bud seedlings in this county. In 1840 he set an orchard from the seedlings in his nursery, and most of the old orchards in the vicinity of Paw Paw are from that stock. The first apples grown near Paw Paw were from the orchard of Mr. Bangs. It may be stated as a matter of interest that this seedling orchard, after growing to twelve inches or more in diameter, began to die out several years ago, and last fall (1879) the trees were all dug out and the field is now (Sept. 1, 1880), ripening a good crop of corn.

John Hunt came to Michigan from Vermont in 1837, cleared a small piece of ground on his farm five miles east of Paw Paw, and the next spring went to Dunham's nursery, south of Kalamazoo, and purchased apple trees for an orchard, which is still standing, although showing signs of decay.

After the Bangs seedlings were used up, the Dunham nursery furnished most of the trees to the settlers, although some came from Plymouth, Wayne county, and a few from Schoolcraft and Cooper, Kalamazoo county. This was between 1840 and '44.

Isaac Barnum came to Paw Paw in 1836, from Cayuga county, N. Y., and brought with him peach pits. From these pits came the first peach trees

grown in the county. They were natural seed, and none but seedlings were known for years. Some of these chance seedlings were of very excellent quality, and one, the Snow's Orange, has attained some distinction.

Elder Samuel Gilman removed from Ogden, Monroe county, N. Y., to Paw Paw in 1838. Mrs. Gilman brought with her seeds of various kinds, among them plum pits. These she planted, and in that early day raised yearly crops of Damson, Gage, and Yellow Egg plums. Barren trees of these seedlings are now seen on several of the old settled farms.

It will be seen that these early settlers came mostly from western New York, where fruit growing was a success, and they desired as nearly as possible to reproduce the homes they had left.

Wild plums, huckleberries, and blackberries were the only fruit known to these early settlers before their trees were large enough to bear.

Dr. J. Andrews of Paw Paw built his house in 1856, and that fall stocked his cellar with three barrels of Greenings, bought in Plymouth and brought here by teams. This was the first large shipment of apples to this place. A few years before James Lee bought a bushel of red apples in Detroit, and brought them in his wagon to his place, three miles southwest of Paw Paw. The Indian Chief Pepeau and his household lived near, and they were elated with the red apples. They would pay almost any price for them, pass them from one to another, and call them *musheemens*, *musheemens*.

Robert Morrison, when a young man, teamed flour from Paw Paw to St. Joseph. Once while at the latter place he found a few barrels of apples for sale. They had come around the lakes from Buffalo. He bought a half bushel at a fabulous price, brought them home and invited the young people for miles around to a party, and entertained them sumptuously on the half bushel of apples—a greater rarity then than tropical fruits would be now.

NEW VARIETIES.

The Rubicon apple and Snow's Orange peach both originated from seedlings in Paw Paw. For a full description of each and the history of their propagation, see Pomological Report for 1873, pp. 320 and 321.

NURSERIES.

Ira C. and A. A. Olds came to Hartford in the spring of 1844 from western New York, and brought with them apple seeds which they sowed, and from the roots they grafted in the winter of 1845, 50,000 root grafts with cions brought from Elwanger & Barry's nursery at Rochester. The next year they grafted 30,000 more, and from this stock a large portion of the old trees in the western portion of the county came. The first 50,000 grafts were set three and one-half miles southwest of Hartford, and the 30,000 grafted the second year were set on the Watervliet road, west of the town a mile or so.

The first trees were sold in the spring of 1847, 100 trees to Austin Beaman, who carried them two miles on his back, and set them on land now owned by C. Putney.

In the spring of 1857 P. I. and L. G. Bragg, brothers, came to Paw Paw from Orleans county, N. Y., looking for a location to start a nursery. They purchased 80 acres two miles east of Paw Paw, on the territorial road. They went back east, and P. I. Bragg returned in a few weeks with 100,000 apple grafts, and set them. In the fall L. G. came on, and in the following winter C. Curtiss, a merchant of Paw Paw, purchased one-third interest in the land and stock, and they formed the partnership of Bragg, Curtiss & Co. From

this stock and later graftings a large proportion of Van Buren county was set to orchards.

About this time Lyman S. Hall settled in what is now the corporate limits of the village of Paw Paw, and started a small nursery.

EARLY PEACH ORCHARDS.

In the spring of 1857 the Braggs shipped here 300 budded peach trees they had grown in in New York, and sold them to N. H. Biteley. Mr. B's neighbors deemed him almost a lunatic. On every farm peaches could be had for the asking. They grew in the fence corners and everywhere—all naturals, it is true, but peaches nevertheless—and they told him he could never sell his peaches. He set them all out on the highest point of his farm, to work out an idea he had long entertained. How he came by that idea is best told in his own words: "The idea of setting them upon an elevation I got originally from an intelligent farmer and orchardist in New York as early as 1844, while engaged in teaching school and boarding around. I had, when a boy at my home in Saratoga, tried to raise peach trees, but the winter froze them back. Relating my poor success to my old friend above referred to one evening, he told me if there was a high hill on the farm, and I would plant peach trees on the top, or, better yet, well over on its northern slope, he thought I would succeed in raising peaches, and gave some of the reasons, which we now understand, for selecting such a location. I never had an opportunity to put the suggestion in practice until I came to Michigan, and the orchard set in 1859 was my first experiment and a success. The first crop I do not know the value of, as I kept no account of sales; but I recollect a subsequent crop, perhaps in 1867, a very fine one, with a good market, and that crop I estimated to be equivalent to twenty-five wheat crops on the same land, and I do not think I overestimated it. I had three fine crops about this date in three successive years, that paid more than double what could have been obtained from wheat from the same ground in a life time. The orchard is still bearing, though nearly done. Perhaps it will pay to leave another year. I think, however, had it not been for those two extremely hard winters which we have had since the orchard has been in bearing, the trees would have been in fair condition now. I have since set many trees, and my neighbors have set largely upon the hills, and every year confirms the fact that the only really safe location for a peach orchard is upon an elevation; and may I not add that while we plume ourselves somewhat on this modern discovery, my old friend Wood knew it more than forty years ago?"

It is a surprising fact that Mr. Biteley should have been raising peaches as successfully as any lake shore locality, and yet his is the only orchard on that whole range of hills; and it is not until within the last five years that any large plantings have been made.

Mr. Engle planted his first peach trees on the hill in 1860, and his first shipments were made in 1864. The orchard has borne regularly, with the exceptions of two or three seasons following extreme winters. No exact figures have been kept of any season's product heretofore, but Mr. Engle furnishes the following facts, the result of 375 Early Alexander trees set in the spring of 1877: This is the third year from the setting and the first fruiting. From the 375 trees were sold 1,227 $\frac{1}{2}$ -bushel boxes. Net proceeds from the sale of same, \$607.41. They were set 16x20 feet apart, and occupied a little less than three acres.

A. D. Healey of South Haven, is reported as having grown last year 9,000 baskets of peaches on a place of 20 acres, over three acres not in trees.

SOUTH HAVEN.

The early history of fruit growing in Van Buren county, without South Haven, would be the play of Hamlet with the part of Hamlet left out. I may say that no one place in the State has furnished so much practical knowledge of fruit-growing to the public as the orchardists and fruit-growers of this region. Its society was organized in 1871, with Norman Phillips as its President, who continued in office four years. T. T. Lyon held the office for two years, and H. E. Bidwell, W. H. Hurlbut, and C. H. Wigglesworth each one year. J. Lannin is the presiding officer at present. The society has held weekly meetings through all these years, and the amount of practical knowledge acquired, and the facility of expression attained by its members is a matter of surprise to the uninitiated. This discussion of topics has led to a nearly uniform practice in the several branches of fruit-growing. Where a dissimilarity prevails, it is among the non-essentials, so that a standard of excellence is reached which the tyro can imitate without much fear of going astray.

The early history of fruit-growing here was not in any sense fortuitous. Those who began had a purpose in view. S. B. Morehouse was one of the first to plant an orchard. This was in 1852, within what is now the village plat. Randolph Densmore also set an orchard about the same time on an adjoining lot. This was two or three years after the old Parmalee orchard at St. Joseph. While St. Joseph had cultivated fields ready for the reception of trees, South Haven had an unbroken forest, requiring the labor of years to remove. So the progress was slow. James L. Reed, Joseph Dow, S. G. Sheffer, and C. M. Sheffer were among the early planters. The first vineyards were set in 1858. Orris Church set one and one-half acres, and A. S. Dyckman set one acre. Aaron Eames first introduced the Delaware grape in any considerable quantity in 1864. A. S. Dyckman, in an address before the September meeting of the State Pomological Society in 1872, said: "With our few hundred acres of orcharding, and our Pomological Society now fairly organized, we are just upon the threshold of successful culture. The incipient idea of our pomological history gave us only the necessity of putting the trees into holes in the ground between great stump roots, then fold our arms and wait for a beneficent providence, with sunshine and showers, to do the rest."

The first fruit shipped from this part was probably about the year 1862. No statistics can be given that will indicate with any certainty the shipments of fruit. Quite a quantity comes from down the shore in Allegan county. Some is taken by sailing craft, of which there is no record. The crop the present year is by far the largest ever raised, and the interest is greatly increasing and will continue to do so unless the yellows gets the start of the wide-awake fruit men.*

NURSERIES.

The Association nurseries and the Hopkins' nursery of South Haven, comprise about 100 acres; both started in 1874, are still running, and growing trees successfully.

A. A. Olds has a nursery in Hamilton growing apple and peach trees; he has about ten acres in stock.

* For a history of Lawton Pomological Society see Pomological Report for 1878, page 230.

Bragg & Nelson of Paw Paw, are growing peach trees extensively. They are now budding the stock on nine acres of ground, which they estimate will make about 200,000 buds set.

C. S. Hoskins is budding about 10,000 peach; he has about four acres in nursery, including apple, peach, and small fruit.

Several other parties who once grew a large amount of nursery stock in the vicinity of Paw Paw have either gone out of the business or removed to other locations. Not more than 10,000 apple trees, all told, are now growing that will be marketable, and no new stock is being set.

LARGE TREES.

We have no large pear trees in our county, and peach trees do not attain remarkable dimensions before they begin to decay. But we have one apple tree which may be considered remarkable for its age; it stands in the yard on the farm of Eaton Branch, adjoining the village of Lawrence on the north-west. It was planted in the fall of 1837; it measures now six feet and one inch in circumference, three feet from the ground; its branches spread to a diameter of 49 feet; it is 40 feet high and still growing. The variety is the Red Romanite. It was purchased by Mr. Branch from Isaac Gibbs, four miles west of Kalamazoo, with a few others, and planted as before stated, in the fall of 1837. One other of the trees is a little larger around but not so tall nor spreading. The soil is a strong clay loam, remarkably well suited to the growth of apple trees.

Wild plum and crab-apple trees, once so numerous here, have entirely disappeared. The curculio and codling-moth have prevented the fruit from maturing, and nature seems tired of its fruitless endeavor to provide for a perpetuation of its species. The huckleberry swamps that forty years ago furnished a large share of the fruit of the early settlers have been despoiled by railroad grades, highways, and State drainage laws. Corn tassels wave where the berries grew, and onions and cabbage occupy the ground once fertile with massasaugas. Wild seedling strawberries were exceedingly uncommon in those early days; the fires that annually swept through the openings prevented their spreading where an occasional plant was found. The dew-berry, or running blackberry as it was called, came in as soon as the fires were checked by the clearings, but not in sufficient quantity to furnish anything like a daily allowance in their season. Wild frost grapes were scattered here and there through the forests, and when a tree was found unusually loaded it was cut down to gather the fruit, destroying the vine and all promise for future fruitage.

A very pleasing contrast is now found in every well-regulated farmer's garden. From the first ripe strawberry early in June, running through the succession of raspberries, a daily supply can be picked for the table. The Early Alexander anticipates the former peach season a month at least, and from the middle of July until October we can revel in the delights of ripe peaches. The Concord and Delaware have brought the cultivation of the grape within the reach of every household. The present apple crop, in its abundance, guarantees to every family in Michigan within reach of a railroad a winter supply at reasonable rates.

We are proud to chronicle the results of the last forty years. What will be the results in the next half century? What additions to varieties extending the season? What new process of preserving or keeping fruit for evaporation? The extent of fruit products in our State is almost unlimited. Where will be

the markets for our surplus? These questions we leave future historians to answer.

Judge Geo. W. Lawton has kindly furnished the following account of

THE PIONEER ORCHARDS OF VAN BUREN COUNTY.

Inquiry has been made for the names of the pioneers who planted the first orchards in the various counties of the State. The question suggests something interesting, and the answers so far as made have proved quite so, especially when coming from the southern portion of the State. In many instances there is well-grounded dispute over the person to whom the honorable enterprise shall be attributed. In others there is a general acquiescence in the name given.

The inquiry is answered from Van Buren county very fully and satisfactorily. The members of the family of the late Dolphin Morris possess very accurate information in regard to it, and his son, Amos Morris, Esq., of Lawton, furnishes the following details and dates.

His father, Dolphin Morris, with his family, moved into this State from Ross county, Ohio, in the fall of 1828, and in the spring of 1829 they settled on Little Prairie Ronde, and within the limits of Van Buren county. Mr. Jones, who resided on McKinney's Prairie, Cass county, had procured some apple trees from Long Island, and he sold fifteen of them at one dollar apiece to Mr. Morris. They consisted of the following varieties, viz: Two Bellflower, one Burrassa, two Winesap, one Vandivere Pippin, one Golden Pippin, one Newtown Pippin, two Spitzenburg, one Leather Coat, one Limber Twig, two sweet apples, and one fall apple (name unknown). About this time Mr. Morris also set out a seedling tree, which was originally planted and grown by the Indian chieftain Pokagon. It was planted on the rise of ground near the cemetery, on Prairie Ronde, and not far from the "old Indian burying ground." The site is now owned by Wm. Roseware. The tree was always known as the "old Indian apple tree." The fruit was of good flavor, medium sized, and striped red.

In 1833, Mr. Morris again set apple trees, purchased of Mr. Moreland, which the latter had grown from the seed. In 1844, a tornado swept over the Prairie, and uprooted thirteen of the first setting, including the "old Indian tree." With the assistance of the neighbors, eleven of these trees were reset, and several of them are yet alive and bearing fruit. Recently one of them, the largest, being measured three feet from the ground, gave seven feet and two inches as its circumference, but this pioneer among the apple trees of Van Buren county, has since succumbed to a heavy wind, and now lies prostrate and broken upon the earth, with no friendly hands to raise and reset it.

In the fall of 1830, Mr. Morris revisited Ohio, and on his return to Michigan the same season, he brought three roots of the Bell Pear variety, which he planted and succeeded in growing. They were small,—he brought them in his saddle-bags, but they are now standing on the west side of the dwelling house of the Morris farm, very substantial trees. He also brought with him some Damson plums, Morello cherries and peach pits, from which he succeeded in propagating fruit.

In 1833, Mr. Morris' neighbors, Mr. LeGrand Anderson, Geo. Tittle and Mr. Swift, who came from Ohio, set out orchards. Mr. Anderson and Mr. Swift

obtained their trees at St. Joseph, Mr. Tittle got his of Mr. Moreland, and Mrs. Tittle brought the first currant bushes from Fort Defiance in 1830.

Now, while their husbands were thus attentive to the economical fruits, the ladies, their wives, did not forget the beautiful and ornamental. Mrs. Morris, though little space could be afforded her in this early breaking up of the virgin soil, secured room in which to grow the peonies, hundred leaf roses, and many other treasured pets she had secured, and Mrs. Anderson also doted over crocuses, damask roses, tulips and snowballs. It is a tradition that Mrs. Morris won many compliments from the new arrivals from the east for her flower garden, the presence of which, in this then distant wilderness, greatly surprised and gratified them. But, while Mrs. Morris triumphed through her beautiful flowers, Mrs. Anderson very successfully contested the field of compliments by means of a thrifty asparagus bed, the product of which she generously divided with her less favored admirers.

But it is not proposed to extend the record of fruit planting in Van Buren county beyond these first instances of it, and we close with a hearty commendation of the good judgment and sterling enterprise exhibited by Mr. Dolphin Morris and his resolute neighbors in the matter, not forgetting the meed of praise justly due Mrs. Morris for the beautiful flowers grown under her hand, rendering cheerful the fire blackened clearings about her garden, or the edible asparagus bed, that made palatable the monotonous meal of venison, bear-meat and corn meal.

REPORTS OF AUXILIARY SOCIETIES.

HOLLAND COLONY FARMERS AND FRUIT-GROWERS' ASSOCIATION.

PREPARED BY ISAAC MARSILJE, SEC'Y.

Agreeable to request, I herewith send you as much by way of report of our Holland Colony Farmers and Fruit-growers' Association as I am able to give. During the year about to close four meetings have been held, at which meetings informal discussions took place on topics pertaining to fruit culture, and as to the best way of giving a public exhibition of fruit, farm produce, and stock, in order to get our people interested in movements to improve in their several branches of husbandry. We find it hard work to draw out our older class, but have hopes for the "coming farmer," the younger people taking hold with some interest, which, however, is not much encouraged by the parents, because the interest is by them not seen. We have not had any essays thus far, so that I cannot send you anything in this line; we are as yet in our infancy, and laboring at a disadvantage, so that a very fast growth cannot be expected of us. At our annual meeting, held December 25, 1880, the attendance was fair. Our Treasurer reported \$11.08 in the treasury. The following officers were elected for the ensuing year: For President, Chas. A. Dutton; for Vice Presidents, Gerrit Rooks, K. Lahnis, Geert. S. de Wit, R. Van Twaluwenburg, Fred. L. Souter, and C. H. Joldersma; for Secretary, Isaac Marsilje; for Treasurer, Arend Visscher.

I also enclose list of members. Those marked with a * pay but 50 cents membership fee and do not draw report from State Society.

LIST OF MEMBERS.

C. A. Dutton, Thomas S. Purdy, Fred. L. Souter, Isaac Marsilje, John Lahnis, Geo. H. Souter, K. Lahnis, Auke Bosma, H. D. Post, Arend Visscher, Gerrit Rooks, Bastiaan Rosbach, Harm Lucas, R. Van Twaluwenburg, G. S. de Witt, John Kamper, Jan Ulberg, G. J. Hekhnis, J. D. Bloemers, W. W. Arthur, G. Van den Beldt, Gerrit J. Hesselink, T. W. Venhuizen*, Teunis Keppel, A. M. Kanters, Ben. Lahnis*, H. Van Eyh, C. H. Joldersma*.

JACKSON COUNTY HORTICULTURAL SOCIETY.

PREPARED BY R. T. MC'NAUGHTON, SEC'Y.

This society was organized April 3, 1880, electing at that time, for its officers
President—W. K. Gibson.

Secretary and Treasurer—R. T. McNaughton.

At this meeting interesting remarks were made by Secretary C. W. Garfield of the State society, Messrs. W. K. Gibson, S. O. Knapp, and others. Some discussion then followed on transplanting trees and shrubs, and those present then joined the society by paying their fees, and the meeting adjourned. A lovely bouquet of flowers was placed on the table by Mr. Elliott Armstrong at the beginning of the meeting, which delighted every one by its beauty and fragrance.

The meeting of April 30 discussed the subject of strawberry culture, being introduced by W. K. Gibson in somewhat the following remarks:—

Of all the small fruits that are successfully cultivated here, none is perhaps better for general use than the strawberry. Of its various methods of culture I need say little, as all are familiar with their practice. The two most common modes are, perhaps, cultivation in the hill and in the matted row. By the former method the rows are placed two or three feet apart, with the plants one foot apart in the row. This is, undoubtedly, the best method for amateur and family use, as the plants produce larger and sweeter berries. By the second plan the rows are made three to three and a half feet apart to allow of horse cultivation, and the plants are allowed to run together and form a continuous row six or eight inches wide. By this plan more fruit is produced for the first year or two, though it is not as fine or well flavored. Some varieties, as the Jucunda and President Wilder, cannot be successfully grown in this way, but hardy early kinds do well. The hill system is required for the fine, large, sweeter and more tender varieties.

In cultivation, two points should be observed: Do not cultivate in spring, and do not cultivate late in fall. On this point all best cultivators are agreed. Simply keep the weeds pulled out until after bearing is past, and then when the crop is off cultivate well and deeply until the 1st of September. The ground should be mulched with clean straw around the plants during the growth of the berries, and the plants during winter should be protected by covering well *after the ground has frozen up solid*. This keeps the plants in place till spring and prevents destruction of the roots by freezing and thawing. As to the time for transplanting, horticulturists differ. Perhaps, all things considered, spring is the best. If not set early enough in the fall to make a vigorous stand and growth, the plants are apt to winter-kill. All beds should be reset as often as once in three or four years. The bed may be spaded up and new plants set, or it may be renewed by allowing the runners to take root in the row midway between the old plants. Sever the connection with the latter as soon as the runners fairly strike root. New varieties are almost without number, and the best ones ought to be raised more by people who wish a fine berry, instead of in a measure wasting their time, labor, and money by raising inferior sorts. It is just as easy to raise a fine fruit, flower, or vegetable as a

poor one, if a person will only attend the meetings of the horticultural society and exchange ideas with others as to the best kinds to raise. [Laughter.] The President Lincoln is one of the largest, some specimens having been raised as large as $7\frac{1}{2}$ inches in circumference. It bears a fine ovate berry, with high color and rich sweet flavor. It is spoken of very highly. Mr. Crawford, of Cuyahoga Falls, Ohio, raises this berry to perfection, and keeps the plants for sale. It needs a strong soil. The Sharpless is also a wonderful bearer and very large—one of the most promising of new varieties, and succeeds well in all soils. The Cumberland Triumph is a uniformly fine bearer, a little more tart than the preceding and not quite up to them in flavor. Of early berries to ripen about the 5th to 10th of June, we have the Duchess, a heavy bearer and perfectly hardy; the Duncan, not quite so good, and bearing very few runners; The Pioneer, one of the finest; the Cinderella, new here, but highly spoken of at the East, etc. For late berries the Glendale and Kentucky are of great promise. The Wilson's Albany is a berry valuable only for market use, its great productiveness and good keeping qualities in transportation giving it a place here; but for home use it is far inferior to the kinds already named.

The cultivation during late summer probably does more good than any mulching can. Grass is not a good substitute for straw, as it is apt to steam and decay and thus mildew the plants. Fermentation around the plants is not good, so that *well rotted* manure that will crumble in the hand like dirt is essential. Watering with solutions of guano or phosphates is also good, and also applications of ashes or salt in small quantities. Deep cultivation and good drainage are necessary.

The question was asked if watering was beneficial, and the general opinion was that it was not, unless the ground is well soaked occasionally, or unless irrigation is resorted to, as practiced by Mr. Dunkly of Kalamazoo (whose method is described in the report of the Michigan Pomological Society for 1879, p. 334). The enemies of the strawberry are not very numerous here. Some places are infested with the grub, which destroys the fibrous roots, and can only be fought successfully by digging it out and destroying. Ants are also sometimes troublesome; brine will kill them.

The discussion then turned upon the care of turf and lawns, and some remarks were made as to some of the fine new geraniums, Cremeo, Mme. Thibau, Arthusa, Gen. Grant, etc., and their culture, and the society then adjourned.

The next meeting was held at President Gibson's house, May 14th, of which, as the Secretary did not attend it, no record was kept.

The next meeting occurred June 11, 1880. The discussion opened on the care of small fruits, and the evening was spent in a general quizzing by everybody present, which brought out many interesting methods and processes. Plants receive fully 94 per cent of their nourishment from the gases in the air, as absorbed through the leaves. A mixture of salt, wood ashes, and lime is beneficial as a dressing for lawns. Wood ashes are stated to contain more elements necessary to the growth of plants than any other one substance.

Some interesting statements were made by Mr. Gibson relative to the analogy existing between plants and animals as to the treatment of their diseases, and as to feeling, instinct, sound, respiration, etc. If a cup of water or a mass of rich plant food be placed at a little distance from a plant, its roots will, as if actuated by instinct, reach out towards and into the nourishing material. The value of ammonia water, glue water, plaster, etc., for plants was spoken of. The care of roses was next discussed. They need cool, moist air in which

to winter well. Rich soil and freedom from insects will produce good roses. Mr. H. F. Thomas stated that the raspberries most growing into favor are the Mammoth Cluster, Philadelphia, and Gregg. The Cuthbert was also recommended by Mr. Gibson. Brinkle's Orange is good, but like some others needs covering in the winter. Raspberries also need a partial shade, as of a fence, or in the absence of that a heavy mulching.

At the meeting of the society Sept. 24, some discussion arose as to fixing up, into respectable shape at least, the little plats of ground dignified by the title of parks, and set aside by the city to be improved and used as such. Far smaller places than Jackson have beautiful little squares dotted with well-grown trees and covered with luxuriant grass, thus bringing a little bit of the country right into the heart of the city for public health and pleasure. The benefit to our citizens of such spots is unquestionable. Says a cultivated writer, speaking in connection with this subject: "Better sewerage, cleaner streets, purer air, increase the development of the physical forces, excite to outdoor recreations, increased cleanliness, self-respect, possible even to the poorest, and the general improvement of morals." It was thought there was a chance in Jackson for improvement in this direction.

Discussion next arose as to the best apples to plant in southern Michigan, and after expressions upon favorite sorts by members present, the Secretary read the following list as favored, in the order named, by Prof. Beal, H. Dale Adams, L. G. Bragg & Co., and I. E. Ilgenfritz, those being placed first which are found in the lists of all those named, viz.: Red Astrachan, Maiden's Blush, Wagener, Baldwin, N. Spy, Red Canada, Early Harvest, R. I. Greening, Talman Sweet, Jonathan, Cayuga Redstreak, Chenango Strawberry, Snow, Lowell, Primate, Porter. The answer of President Lyon of the State Horticultural Society, to the above question, in the *Post and Tribune*, is as follows:

I will give you my views in response to the above query. I may be allowed to remark that a satisfactory list of the varieties to be recommended must depend not altogether upon the location and soil in which the planting is to be done, but in a good degree also upon the tastes and preferences of the planter. Should it turn out that the querist is one of that very numerous class of persons who grow apples as they do turnips or potatoes, merely as a means of adding variety to the culinary department of his household, and who rarely partakes of apples or places them before his friends in an uncooked state, the following list will afford a good succession of varieties sufficiently hardy and productive for the region indicated (southern Michigan): Early Harvest, 2; Primate, 3; Red Astrachan, 3; Sweet Bough, 2; Maiden's Blush, 5; Lowell, 5; Jersey Sweet, 2; Twenty Ounce, 5; Fameuse or Snow, 5; Talman Sweet, 3; Jonathan, 10; Peck's Pleasant, 10; Northern Spy, 10; Golden Russet, 10; Red Canada, 25;—Total, 100. If, on the other hand, he shall turn out to be a lover of fruit as such, comprehending the fact that, in its pristine condition, it is one of the most healthful articles of diet, he will be certain to desire such varieties as he will be proud, upon occasion, to place before appreciative friends, even though to secure these he shall be compelled to include in his plantation some that may not be considered relatively profitable, and even such as demand good culture and management to produce them in satisfactory condition. Besides, a person of such tastes will scarcely content himself to so fully act up to the popular idea of the day as to only provide a succession such as shall supply him one variety of the earlier sorts for each season, but will rather demand that he be able at any and all seasons to place upon his table a choice of varieties, beside a supply of sorts which being specially suited to culinary

purposes are for this very reason less suitable, if not wholly unsuitable, for the dessert. To a person of such tastes or preferences we commend the following selection, viz.: Early Harvest, 1; Primate, 1; Red Astrachan, 2; Sweet Bough, 1; Early Joe, 1; Jersey Sweet, 1; Maiden's Blush, 2; Garden Royal, 1; Lowell, 3; Gravenstein, 2; American Summer Pearmain, 2; Ohio Nonpareil, 4; Twenty Ounce, 5; Shiawassee Beauty, 2; Melon, 3; Bailey's Sweet, 2; Jonathan, 10; Hubbardston Nonsuch, 5; Talman Sweet, 2; Northern Spy, 15; Golden Russet, 10; Swaar, 5; Red Canada, 20;—Total, 100.

We omit from these lists those old favorites, Baldwin, R. I. Greening, Roxbury Russet, etc., mainly for the reason that although in most respects desirable in this region, they are clearly exceptionable from lack of hardiness.

Right here was mentioned the fact that planters do not always avail themselves of the latest knowledge and experience in trying new sorts of fruit trees, but will allow themselves to be duped by men who claim perhaps to be agents for a reliable nursery, and who may not be what they claim to be, who offer some remarkably fine and wonderful plant which they *warrant* to be as represented, but who, when the plant proves a failure, are never at hand to right the matter. We must work for good fruit as for any other good thing, and cannot get fruit worth raising which will raise itself. *No* good plum is curculio proof, and there is no such thing as a pear free from blight, or a strawberry without runners which is worth raising for profit, as all good authorities will say, and farmers *ought to know it*, and not allow themselves to believe everything that is told them.

A few remarks by Prof. Beal, in a letter to R. W. Judd of this place, are in point here. He says: "The new Russian apples have not been sufficiently well tested to warrant general distribution. It is not at all probable that they will be as good as others we now have. The Weaver plum is a sort of wild plum of ordinary merit. It is *not* curculio proof, nor is any other plum which is worth raising in Michigan. The best thing the farmers of your vicinity can do to get rid of the swindling fruit tree agents, is to join the horticultural society just formed in Jackson. There is no strawberry without runners which is worth raising for profit."

The society voted to establish headquarters at the coming county fair, where their work could be investigated and memberships taken. The following resolution was then passed:

Resolved, That we make a broad distinction between reliable and unreliable fruit agents; that we believe that nurseries in this State have all kinds of nursery stock worth planting here, and that persons will be safe in purchasing therefrom.

The society then adjourned.

At the meeting held October 15, 1880, the topic was "Transplanting and what to transplant for ornament."

H. F. Thomas opened the discussion by saying that in setting out an orchard he would depart a little from the usual custom, and plant the trees in distant rows, say 64 feet apart, with trees 24 feet apart in the row. Would plow a deep furrow and put in manure (and stones if there were any in the way), and then fill up by back-furrowing a ridge, on which, in the loose, fine bed, set the trees. Young trees, apples and pears say two years old, and peaches one year old from the bud are better than older. Before transplanting (especially if taking a good sized tree from the woods), all trees should be made to develop fibers close around the tree by cutting off the long roots—in a nursery tree by transplanting often, and if from the woods, by cutting around the tree

the year previous and putting some rich earth around the roots. Have a proper respect for the roots of the tree, and don't mercilessly tear off the fibrous roots,—its feeding mouths. But the after treatment is of the most importance to preserve the tree. Keep the surface clean and mellow by hoed crops or otherwise, or next best, mulch well around the tree to keep down the weeds and preserve moisture.

Mr. A. J. Gould then continued the same subject, by speaking of his success in transplanting evergreens, particularly the red cedar. Don't be afraid to cut the top of an evergreen, such as the cedar, spruce and pine. The white pine will form a compact and beautiful head by cutting back and shortening in the branches. It is not best to water a tree after setting it out. If a dry time comes, rather loosen up the ground and keep in the moisture by mulching.

The discussion then turned on the improvement that might be made in our city and village streets, and country roads, if people would consent to take a little pains to plant trees as well as to cut them down. What is more pleasing to all that is refined and noble in a man's soul, than to see a well-kept street, lined with graceful and elegant elms, maples, whitewood or other good street trees, or to pass a house where the well-kept lawn, the vines on the trellis or the house, and the shrubs and trees on the grass plat, be it never so small, give evidence of taste and a desire to surround one's home with beauty? Yet in spite of the pleasure it gives to plant trees with one's own hand, and see the increasing beauty of the drives and lawns about our dwellings, many will not go to the slight trouble and expense of doing so, but will crowd their houses with sofas and carpets, chromos and "what nots," and leave their surroundings rough and desolate. If you care to see our beautiful city look more beautiful, and our whole country smile with verdure like "Bonnie England," if you are disposed to beautify your dwellings, *plant shrubs and trees*, and do it this fall. Commemorate your birth day or other signal event, by planting a tree. If you own a village lot on a street bare and unattractive, increase its value by planting on it the trees mentioned above, or the horse chestnut, basswood, cherry, white ash, purple beech, cut-leaved birch, or the evergreens,—Norway and hemlock spruce, and Austrian, Scotch and white pine. Dot your lawns with grapes and single specimens of such shrubs as spiraea, flowering almond, chionanthus (white fringe), barberry, calycanthus and syringa, and train vines like Virginia creeper, clematis in variety, and aristolochia, over your porches. Then if the Horticultural Society should ever offer a premium for the neatest and best kept lawn in the county, you would be sure to get it.

It was stated to be understood that a rebate of highway tax was allowed on trees planted along a highway to the amount of twenty-five cents per tree. After some other minor debate the society adjourned.

Besides the holding of these meetings from time to time for the benefit of its members, the society has sought to interest others by publishing the reports of its meetings pretty fully in the city and county papers, and occasional copies have been sent to the State and other papers interested in horticulture. A number of reports of the State Horticultural Society of different years have been procured and distributed somewhat, and at the fair of the county Agricultural Society, a headquarters was established where opportunity was given for all who passed to see something of the nature and work of the society. By these and similar means, we hope to extend our work and influence so as to do what we can for horticulture in Jackson county.

OFFICERS AND MEMBERS FOR 1880 OF THE JACKSON COUNTY HORTICULTURAL SOCIETY.

President—W. K. Gibson, Jackson.

Secretary and Treasurer—R. T. McNaughton, Jackson.

Geo. T. White, Jackson; A. J. Gould, Jackson; H. W. Doney, Jackson; Alex. Brown, Jackson; H. F. Thomas, Jackson; Elliott Armstrong, Jackson; M. A. McNaughton, Jackson; Mrs. Wm. M. Bennett, Jackson; Mrs. W. K. Gibson, Jackson; Mrs. Dwight Merriman, Jackson; Nathan Shotwell, Concord; J. W. Peck, Jackson; James Pierce, Leoni; Geo. Sawyer, Grass Lake; V. B. Kennedy, Hanover.

SOUTH BOSTON HORTICULTURAL SOCIETY.

PREPARED BY J. D. STANNARD, SEC'Y.

OFFICERS FOR 1880.

President—D. H. English, Saranac.*Vice President*—C. C. Winegar, Chandler.*Secretary*—J. D. Stannard, Lowell.*Treasurer*—W. Young, Lowell.

The members for 1880—J. C. English, Lowell; A. S. Stannard, Lowell; G. L. Stannard, Lowell; W. S. Story, Lowell; S. K. Remington, Lowell; Mrs. J. C. English, Lowell; Mrs. A. S. Stannard, Lowell; S. W. Towl, Lowell; B. Chapman, Chandler; J. Turner, Chandler; Mrs. B. Chapman, Chandler; E. H. Hunt, Saranac; J. F. English, Saranac; J. Leak, Saranac.

The South Boston Horticultural Society was organized April 24, 1880. The society has held three subsequent meetings.

At our summer meeting papers were furnished upon the subjects,—Apple Orchard; The Kitchen Garden; Summer care of House Plants; and a talk from Mr. J. D. Husted, upon the Peach Orchard.

At our fall meeting, the desirability of working the apple crop into jelly, and the value of apples for fodder, were the questions that engaged most of our time. All experiments tended to prove that apples had considerable value for feeding, and could be fed with profit in years when there was an over production.

We are not a horticultural people, and we do not consider our papers and discussions of much value only to ourselves, but we believe in our society. All of our meetings have been very interesting, and we are acquiring a practical knowledge of horticulture which cannot fail in being beneficial to us.

WOODLAND HORTICULTURAL SOCIETY.

PREPARED BY EUGENE DAVENPORT, SEC'Y.

This Society was organized June 2, 1880, by Secretary Garfield. Seventeen members were enrolled, and the following officers were elected:

President—Ira Stowell.

Vice President—Mrs. Joel St. John.

Secretary—Eugene Davenport.

Treasurer—Jesse Jordan.

During the meeting, after Mr. Garfield had presented the advantages of such societies, Miss Emily Holmes read an essay on "Home and Home Adornments," in which it was held that books, music, pictures, and flowers had an unbounded influence over the members of a household.

An essay was also read by Mrs. Joel St. John entitled "Flowers," in which, after cautioning against the too free use of water, an excess of earth, and abuses in general, their uses and advantages were enumerated. "They will grow and flourish in any atmosphere that is available for breathing as to moisture, purity, etc." It was argued that gardening and botany should be taught in our common schools, developing a love and respect for the garden and the farm. The notion among mothers that it is impossible for them to raise flowers on account of certain piratical invasions of "baby,"—said baby in question often being two or three years old,—the writer considered to be ill-founded. Said the writer: "The French say that a baby is an angel whose wings grow shorter as his legs grow longer. Though 'baby' is king in most households, he cannot too soon learn that he is *not* an *absolute* monarch, and that not all he may survey is his to destroy. As the little fingers wander plantward, the eyes turn motherward." The writer argued that then is the time to dethrone the king, and that a barbed wire fence around the stand, although the most cruel invention of the age, would be perfectly justifiable in extreme cases. But worst of all,—and the writer suggested no remedy,—were the "grown up babies," who must always see with their fingers.

Meeting held August 9, 1880.

At this meeting the subject of weeds was discussed, mainly showing the need of a more intimate acquaintance with their habits, and greater efforts toward their subjugation. This was brought out during the discussion, in which various specimens were exhibited, and some estimates made of their powers of seed-ing. Many more varieties were found to be with us than was at first supposed.

The remainder of the meeting was devoted to topics pertaining more directly to the farm.

At the meeting held October 16, 1880, Rev. Mr. Ornick spoke on horticulture as a pastime. He recognized the fact that all persons need something which is a diversion from regular business, as being an important one, and argued that horticulture possesses all the advantages of the gymnasium, or other plan for physical exercise merely, and it has the additional merit of being educational. He therefore recommended it as a fit pastime for students

and business men of all kinds who feel the need of exercise out of doors. He spoke in terms of the highest praise of the plan at the Agricultural College of combining labor with study.

Mr. B. S. Holly gave a report of the fruit exhibit at the Barry County Fair, making the usual criticism of our fairs, viz: careless labeling, and poor arrangement.

A report of the flowers at the county fair was read by Miss Jessie Barnum.

In the discussion which followed these reports, Mr. Ornick took strong grounds that the name of the exhibitor should be attached to the article exhibited, that one desiring to purchase or inquire as to details may know where to find the owner.

A very interesting essay was read by Mrs. Joel St. John on "Preparation of Plants for Winter Flowering." It consisted mainly in directions for inducing flowering during the winter season. Much the same has been printed from time to time in the reports, and no extracts are made.

Several experiments are being made this winter in methods of keeping apples, owing to a discussion of the subject at this meeting. Probably most of them will prove disastrous. Mr. St. John keeps apples in shallow boxes, holding two bushels, stacked in the cellar one above another. He says they keep well. One vital point in his practice is the careful sorting of his apples into three grades, the fruit being put up as described, and the other low grades are usually given as a thank-offering to the pigs.

At the annual meeting the following officers were elected:

President—Ira Stowell.

Vice President—B. S. Holly.

Secretary—Eugene Davenport.

Treasurer—Jesse Jordan.

Most of this meeting was devoted to discussing topics of general farming. Mrs. Joel St. John read an admirable essay on "Household Economy," dealing especially with the proper cooking of vegetables, and use of fruits. Through oversight the paper was not secured, and extracts are impossible. The author, however, made some substantial criticisms on the careless and tasteless manner in which both fruit and vegetables are often found on the farmer's table.

LIST OF MEMBERS OF SOCIETY, 1880.

Ira Stowell, B. S. Holly, Jesse Jordan, Rev. J. F. Ornick, E. P. Barnum, C. E. Ingerson, R. Christian, Joel St. John, E. J. Nash, Eugene Davenport, Mrs. Joel St. John, Ella Barnum, Jessie Barnum, Mrs. Holly, Emily Holmes, John Lee. All residents of Woodland.

LAWTON POMOLOGICAL SOCIETY.

PREPARED BY GEO. W. LAWTON, SECRETARY PRO TEM.

The society has voted to organize as a branch of the State society, and will comply with its rules. During the year past the members have generally devoted the meetings of the society to the advancement of the growth and culture of the peach as a market fruit. Very little "sentiment" or æsthetical ebullition have had place in their discussions. This may not be for the best in the long run, but the eye of *our* fruit growers rests first on the bread and butter side of the business. Hereafter, when it becomes to them less exacting of the "sweat of thy face," they will give room for lighter emotions. No lady as yet has participated in our meetings, though we want not monitions that she is about to appear.

The amount of fruit marketed from this point during the past year has been large, and I may add, by far the largest in our history. The price received for it has been uniformly remunerative. In saying this, it must not be forgotten that prices at times during the season ruled low, but, however low it fell, no member reports actual loss; on the contrary, each returns *some* profit. There has been loss out and out by the breaking up or into of packages, and stealing the fruit, on the part of the employés of the express company. This depredation has occurred in small amounts at a time, and the aggregate, though considerable, is not included in the above statement.

We may remark here, as well as elsewhere, that *it is* practicable to handle fruit without such inexcusable loss. The first step to be taken to prevent it is for the express company to refuse employment to any man lacking in care and integrity; and the second step is for the consignee of the fruit to persistently refuse to accept or receipt for shipments that have been broken into, or are short in number of packages. A favorite way adopted to avoid the responsibility of this loss is to get the carter or drayman, probably a hard-working man, illiterate, and dependent upon his labor for his own and his family's support, to sign a printed form, receipting thereby for the goods in "good order," clearing, it is thought, by this device, the express company, and driving the consignee or consignor to look to this irresponsible laborer for the damage, if any, on account of the breakage or loss by theft. This evil can only be checked by the united efforts of the fruit-growers. Let every one insist that his consignee shall refuse damaged lots and those short as to number unless the carrier will settle on the spot for the damage or shortage, as a condition of his custom, and the commission men and the carrier will soon come to terms, and little or no stealings and only purely accidental breakages will afflict us.

Each variety of peach ripened this year unprecedentedly early. Good specimens of the Alexander or Amsden ripened on the tree, free from worms, and were exhibited to the society on July 3d; and shipments were made the week following, notably, on the 9th, and by the 20th inst. shipments were large, and continued heavy through the season, *i. e.*, until "snow peaches" came, as the wearied express messengers expressed it. Mr. Joseph Allard

brought out these early specimens. His orchard is on the hills east of the village. The soil is dry and gravelly, with a general western exposure.

The quality of the fruit raised this season was of the highest grade, and met with uniform commendation in every market to which it was sent, and this quality was uniform throughout the majority of the orchards represented in our society. It was enhanced no doubt by the thorough thinning practiced and by the considerable effort made in exterminating the curculio; besides, as a general rule, only selected peaches were packed for market, which good practice even the most avariciously inclined were content to follow, since they could dispose of the unpackable fruit at the evaporators, which have been erected here during the season. The proprietors of the evaporators (Williams) paid from 15 to 50 cents per bushel for their fruit. In this connection, it may be noted that five or six individuals, as the season progressed, found it advisable to provide themselves with farm evaporators suited to their wants. How profitable they have proved is not yet disclosed.

No diseased or "yellows peaches" were, so far as known, shipped to market from this locality. Our purpose is not to suffer, so far as it may lie in our power, this vile imposition on the consumer. There was a shipment, which came to this station over the T. & S. H. R. R., consigned to De Moines. This was allowed to pass on, but our people expressed themselves as having been remiss in their duty in so doing. The sooner peach-growers of Michigan learn and act upon it that only *first quality of healthy peaches* should go into market, the sooner will they become masters of their business. They will find, without much trouble or effort, a superabundance of *poor* fruit every season; but with all the trouble and effort that may fall to them they will find in no season an over production of excellent fruit. As well might we attempt to satiate a healthy boy with real fun as to fill the demands of consumers for *excellent* fruit. We have only to place it within their reach to receive their money for it, and as this touches the question of over production, I add to raise excellent fruit is the first desideratum with us, and this rules out very promptly all diseased fruit. Our second care is to preserve the fruit until it can reach the consumer, and the third is to procure the proper transportation of it to the consumer. These conditions being met, we have no apprehension of an over production of the peach. Being located about midway between Chicago and Detroit, with the several large towns and distributing points intervening, we are not seriously troubled over the above second or third enumerated cares. The Mich. Cent. R. R. Co. gave us this season, for the first time, six freight cars, fitted up with shelves on which to place the packages of fruit, charging five cents to Chicago and seven cents to Detroit for each basket or box. Under this arrangement the shipper saw his packages properly and securely placed in the car, with little or no danger of breakage and theft, which left here in the evening and reached Chicago or Detroit by five o'clock in the morning in good order. The coming season promises a renewal of the practice on a larger scale and with greater facilities.

As to the varieties, I remark the Early Beatrice grew to a size that rivaled the Alexander and acquired a flavor far superior to it, characteristics not known by us to be possessed by that variety. The Late Crawford did unusually well this season, ripening early, and attained throughout the tree large size, high color, and fine flavor. The Late Smock, in some cases, ripened up undersized, but generally held its own.

The white varieties as a rule excelled in size, quality, quantity, and profit.

It would be impossible to compress into this report the useful observations made upon them, including the well known Early Rivers, Mountain Rose, Old Mixon, Stump the World, and Heath's Cling, for which order upon order specially made came to our members to be filled, extending long after the season for the variety had passed. Many thousand trees will be set hereabouts in the spring, and the orchard acreage greatly increased.

The "yellows" has been met by the orchardists with the unrelenting grub-hoe and fire-heap, and the progress of the disease in their orchards has not been very serious, though sufficiently aggravating to the most submissive among them.

Other fruits have not received all the attention they merit by the society, though many raise large crops of the smaller varieties. Apples, though a large crop in general, have not yielded a surplus of high-colored and perfect fruit. The trees for the most part have groaned under burdens of undersized, colorless fruit, and the codling moth has been very active all the season.

Grapes were only a half crop. The late and long continuing fall of 1879 induced the Concord buds to swell and to be ruined in course of the winter. Many of the cones, notably in "spots" in the vineyards, were entirely budless and leafless until late in May. The yield from such vines was nothing. They seem, however, now to have fully recovered their vitality, and this year's canes promise abundant yield. The Delaware, not answering to the seductive November sun as did the Concord, wintered well and fruited a large crop, but owing to the thrip much of it was injured and lost. All of our vineyardists have peach orchards also, and the thrip was left to work the ruin of the Delaware in their anxiety for the peach. The demand for our Concords—sweet Concords, they are called—far exceeded the supply. The prices ranged from $3\frac{1}{2}$ to 5 cents per pound.

A new variety of grape (supposed until information to the contrary is received) has been produced here by Mr. W. W. Robins. It is a chance seedling, if a new variety, and is a rank grower. The foliage resembles the Salem. The fruit is a little larger than the Clinton, but is dark red, and grows in short, chunky, but on the whole handsome, and tightly compacted clusters. The skin is tough, pulp seedy, but sweet throughout and pleasant to the taste. It ripens where now grown ten days before the Hartford. There is but the one bearing vine, and this is trailed on the east side of Mr. Robins' dwelling—a warm, pushing locality. It is an abundant bearer, and hardy. We will in due time have field specimens of it, and then further report.

Among the notable events of the year past was a short but pleasant visit from the Secretary of the State Horticultural Society. He was whirled by a span of fast roadsters, in and out and among the orchards, halting long enough to glean a ripe peach (for it was early in July) in his flight, and say "good bye" the instant before he disappeared beyond the foliage. He tasted of no one's pastry, and all the sisterhood feel slighted. Nevertheless the visit did us good, and the latch-string hangs invitingly out for another pull. The officers of the society remain the same.

GRAND RIVER VALLEY HORTICULTURAL SOCIETY.

PREPARED BY W. N. COOK, SECRETARY.

In accordance with custom I herewith submit the following report of the doings of the society for the year just closed. The monthly meetings have been held and the exhibition of fruit and discussion have been both interesting and profitable.

Early in the year President Rowe called the attention of the society to the importance of the subject of yellows in peach trees, saying that the disease was becoming wide spread and destructive in the southwestern portion of the State, and urging the society or its members to make themselves acquainted with the disease, at least so far as to be able to know the malady should it make its appearance in this vicinity.

This suggestion was followed by the appointment of a committee to visit the yellows district and get what information they could on the subject. This committee were invited by the Allegan Pomological Society to visit them in August, which invitation the committee accepted, and in company with a number of peach growers of our county went to Allegan, were welcomed and entertained by the Allegan society and every facility offered to further the object of their visit. The committee also secured a diseased tree and exhibited it on the fair ground during the West Michigan fair. After its close the tree was destroyed by burning. Further discussion of this subject is proposed some time in January next. On their return this committee made a full report to the society, which is on file. The society have also made a departure from its usual mode by holding several of its monthly meetings at the residences of its members, thus furnishing an opportunity to those who have not usually attended to become acquainted with the objects and work of the society; the results thus far have been very gratifying and in my opinion the practice should be continued. Our field of operation embraces the counties of Kent, Ionia, Montcalm, Barry, Allegan, Ottawa and Muskegon. All of them should become interested in this work and one or more of our monthly meetings should be held in each of these counties annually.

At the August meeting the Messrs. Pearsall, Rowe, Cook, W. K. Emmons, and P. W. Johnson, were appointed a committee to collect and exhibit fruit at the State fair of this State, West Michigan agricultural and industrial fair, and any other fairs, in the discretion of the committee. Soon after this the secretary received the premium list of the Mississippi valley horticultural society, and laid the matter of making an exhibit at St. Louis before the committee and the executive board. It was decided to make an exhibit there, which design was carried out. The society exhibited 100 varieties of apples in one collection, 40 varieties in another, and 10 varieties as a collection for the market north of the forty-first parallel; also several single plates of apples and pears; also a collection of 25 varieties of peaches, one of 10 varieties, and several plates. This show of fruit at St. Louis was in charge of President Wm. Rowe and Mr. Cook, and received marked attention from visitors. Dr. Warder of Ohio, chairman of the awarding committee, said Michigan fruit

was the best grown on exhibition, and the most correctly named. The awards have already been reported to the society. In my opinion this exhibition of our fruit at the great fair of the Mississippi valley horticultural society is of the first importance to the fruit growers of western Michigan, and that it will bring about greater results than any other exhibition from our State up to the present time.

At the State fair our society exhibited a general collection of family fruits consisting of fifty-three sorts of apples, four of peaches, three of grapes, four of pears, and four of crab-apples.

Owing to the extreme warm, wet weather when the fruit was being collected, and the prevalence of mildew in grapes, the exhibit in peaches and grapes was not up to the usual standard of the shows of our society, and in consequence the collection received third premium.

In Division B, a general collection of market fruits, 100 plates apples, five of grapes, six of pears, four of crab-apples, received the first premium.

In Division C, special exhibit of apples for general purposes, consisting of sixty-seven varieties, received the first premium. We also received first premium for most correctly named collection in this division.

The society also took premiums on sixteen plates of different sorts of apples.

At the West Michigan Fair, the Secretary entered a collection of fruit, and received the first premium. Also, on a collection of apples he took first premium, and took a dozen single plate premiums.

At the adjourned annual meeting of the society, held on the 26th day of October, the officers for the ensuing year were elected to wit:

President—Wm. Rowe.

Vice President—W. K. Munson.

Secretary—W. N. Cook.

Treasurer—S. L. Fuller.

Members of the Executive Board—Wm. K. Emmons, Eugene Carpenter, S. M. Pearsall, P. W. Johnson.

In conclusion, I wish to congratulate the society on their successful labors during the past year. While our membership is small, the interest has been kept up, and I see nothing to prevent them performing greater success in the future.

All of which is respectfully submitted.

ALLEGAN COUNTY POMOLOGICAL SOCIETY.

PREPARED BY E. C. REID, SEC'Y.

OFFICERS FOR 1881.

President—George T. Lay.
Vice President—John B. Dumont.
Secretary—Edwy C. Reid.
Treasurer—Benj. D. Pritchard.

March Meeting.

This society was re-organized into its present form March 16, 1880, having previously existed under the same name, but independent of the State society. It was organized Jan. 18, 1879. At the former date the society was addressed by Secretary Garfield, and, after some discussion, the constitution and by-laws prepared for auxiliary societies by the State society were adopted, and under them Geo. T. Lay was chosen president, H. G. Buck vice-president, Edwy C. Reid secretary, and B. D. Pritchard treasurer. These, constituting the executive board, with Mr. G. H. LaFleur added, were made a committee on programme for the year. Messrs. J. Sailor, J. S. Bidwell, H. G. Buck, and Allen Wood were made a committee to examine the premium lists of the county agricultural society, and recommend changes in the pomological department,—addition of names of desirable varieties, the expunging of worthless ones, etc. Seventeen members were received.

April Meeting.

The best way to plant fruit trees was made the topic for papers and discussions at the society's second meeting. Mr. G. H. LaFleur presented the following:

I start with the premise that every person who owns an acre of ground, and is making a home for himself and family, realizes the necessity of planting something in the way of fruit trees, from the fact that it adds largely to the health, comfort, and profit of the family. The first thing to be considered is the selection of varieties. The varieties best suited to the family and home use should be the first thing to be provided, so that the family may have fresh fruit the entire year. Next come the varieties for the commercial orchard, which should be selected entirely with reference to profit in dollars and cents. Careful observation, with good judgment, will enable any one to be quite accurate in making selections for this purpose, keeping in view the kind of soil upon which the orchard is to be set, and adaptability of varieties to that soil and location. A mistake in this matter of selection cannot be readily corrected, and not without loss, if at all. It is of almost equal importance that the location be what it should, as the best varieties with the best care will fail to produce satisfactory results in an unfavorable location. Select the highest elevation upon the farm, on account of its being warm and dry, and less liable to the frost of spring and autumn. Whatever the location, the soil should be dry and free from surface-water. If it is not, then tile, or some sort of under-

draining, will be necessary, or your trees will fail to be satisfactory either in productiveness or longevity. Keep the feet dry and warm, and the head will perform its part, provided you feed it well. Different varieties of fruit trees require different kinds of soil. The quince, plum, pear, apple, and crab-apple will flourish on heavy soil mixed with clay loam. Peaches, grapes, cherries, and some of the small fruits, find a more congenial home on a light, warm, dry soil, and require more artificial food. The same variation in soil which is required for the different kinds of trees or fruits may be observed in regard to the different varieties in the same class. The Baldwin, Golden Russet, Strawberry, Red Astrachan, Maiden's Blush, etc., do not require the same kind of soil that the Swaar, Greening, Roxbury Russet, Peck's Pleasant, and Newtown pippin flourish best upon. Different varieties of the peach require different properties in the soil to produce the best results. This is a question upon which persons planting out peach orchards, as well as apple orchards, should be better posted in. Careful observation and comparison will enable planters to draw very correct conclusions in this matter of adaptability to soil and altitude.

Next, after selecting varieties and location, the preparation of the ground will come in order. The plainest and simplest statement which I can make of that part of the work is, plow over the whole plat of ground upon which the trees are to be set, the deeper the better; drag it thoroughly, and rolling would be an improvement and facilitate the setting out. The holes should be dug at least six inches deeper than the roots of the tree reach. Fill in with surface soil, for the roots of the tree to stand upon, even when the tree is set at the proper depth, which should be a little deeper than it stood in the nursery row. The tree should next be prepared for setting. All roots which have been mangled or broken should be cut back to where they are sound and fresh, cutting from the under side, slanting outward. The top should be trimmed somewhat, according to variety and condition of the tree. I am not in favor of cutting back so severely as some planters are in the habit of doing. A boy should hold the tree in its proper place, and the roots and fibres should be spread out and the surface soil placed around them, keeping the roots in place with the hand. Pack the earth moderately around the roots, and leave the ground level around the tree, placing a good mulch around the trees before the ground has had time to dry. Before setting, the tree should be dipped in mud made from swamp muck mixed in water to the consistency of paste. An old barrel sawed in two, or a wash-tub, will answer for the purpose. Each tree should be dipped before setting. I am satisfied that a large percentage of the losses which occur in setting fruit trees is from want of proper care in transplanting. This fact is proved every year, as it often happens that two men take trees of the same variety, in the same condition; and one will lose a large percentage of his trees while the other loses scarcely one. When the tree is once set in the orchard row, then the real work of properly handling the tree has but fairly commenced. Not a week should pass without personal inspection by the person who has the orchard in charge, for the old adage that "As the twig is bent so the tree inclines," is literally true in the case of fruit trees. Every bud or twig starting out upon the side of the tree where it is not wanted should be removed as soon as discovered. All buds should be protected and allowed to grow upon that part of the tree necessary to preserve a uniform top. Care should always be taken to place that side of the tree which has the most limbs, or strongest growth, towards the quarter from which the prevailing winds come. Trees should be so managed as to keep them in a

perpendicular position if possible. I regard a northern or northeastern slope with timber protection on the north and west, the most favorable location. A lake or stream of water at the foot of the hill on which the orchard stands is favorable, and is something of a protection to the orchard against spring and autumn frosts.

Methods of setting so as to secure accuracy were discussed, and all agreed that the only way to secure perfect accuracy was by the eye. Some would set a stake for every tree, while some had been successful by setting the trees by two ranges of stakes set at some distance in advance. A device, shown by J. A. Frost, for securing accuracy, after the spot had been determined, was approved. It consists of two pieces of wood about three feet long and two inches wide, joined by a hinge. The outer end of one piece is forked or deeply notched; the other piece bears two pins, six inches or more long, one near each end, protruding from the side opposite the hinge. Before the hole is dug the notched end is placed at the exact point where the tree should stand. The pins are forced into the ground and the piece bearing the notch is folded back upon the other. After the hole is ready the notched piece is restored to its position and the tree placed in the hole so that it rests in the notch, and the earth being filled in, it remains in position.

The secretary then read the following paper from the Rev. J. F. Taylor, of Saugatuck :

PLANTING PEACH TREES.

This subject naturally suggests location, preparation of the soil, distance between trees, method of planting and treatment during the first summer.

In speaking on this subject, with these subdivisions, we shall endeavor to point out the best conditions which observation and experience have indicated for successful peach growing.

Location: A few trees may very appropriately find a place on every farm; but when the peach orchard is to be a principal source of revenue for the family, the location should be such as not to disappoint the hopes of the planter. He wants peaches, not every third, fourth, or fifth year, but every year. His daily bread comes through the peach. It is not a luxury, it is a staple to him and his family. Viewed in this light, location is of the first importance. Not every spot of ground, even in this favored latitude, is desirable for a peach orchard. Low lands are especially to be avoided. Frosty places are of very doubtful propriety, for while the trees may do well for a time the fruit-buds will often be injured when they are nearly ready to open. Elevated lands are therefore most valuable for peach growing. Our coldest weather generally comes when there is no wind, and the injury to fruit buds is done when there are no air currents to break the intensity of the cold. Even elevated plains are not as free from severe frosts as rolling land. A sheltered location is not necessary, and may be far inferior to one where the west wind can sweep along in all its accustomed fury.

Preparation of the soil: This part includes dryness. Good locations are not always dry enough for the healthy growth of peach trees. Like feeble children, they must not be allowed to have wet feet. Gravelly and sandy soils are for the most part sufficiently drained, unless an impervious subsoil holds the water near the surface. Then artificial drainage becomes necessary. Clay lands frequently hold water during the winter and spring months. In all such cases drainage is of the highest importance. The unfavorable effect of standing water around the roots of peach trees cannot be well understood until the

experiment has been tried; but with us, near the lake shore, illustrations on this point are too numerous to leave any in doubt. Very much of the injury done to trees last fall (1879) can be traced directly to the growth occasioned by too much moisture during the warm days of October, followed by the cold "snap" of November. And it is not too much to say that thousands of peach trees have been lost during the past ten years because their roots were in very wet ground during our cold winters. After good drainage is secured, other preparation should follow. If the land is new, remove all the stumps. One or two years' time in starting an orchard cannot compensate for the disadvantages of cultivating trees among stumps. Dig them out. The results in a few years will be much more satisfactory. The preparation of a field for young fruit trees should approximate a garden. If the land is worn out by constant cropping, or if it is a light, sandy soil, fertilization is desirable before planting.

In growing peach trees, very much depends on a good beginning. No effort of later years can compensate for a failure in starting. A stunted peach tree puts on an old appearance, even if it has not been in the orchard more than one year, which after cultivation never entirely removes. To secure a vigorous growth from the time of planting, holes may be dug in the fall before the ground becomes frozen. During the winter, scrapings from the barnyard, or even coarse manure, may be hauled out and a few forkfuls thrown into each hole. Snow and rain will leach this manure and fertilize the ground, where the tree is to be planted, and the residuum will make a good mulch for this new occupant of the soil. It is not desirable to plant trees in sod ground or in fields of grain where a crop is to be harvested. Such a process robs the tree of moisture in mid-summer when it is most needed. Land that is free from all the defects alluded to above, and in condition to bring a good crop of corn, is ready for peach trees. To facilitate the planting, two furrows may be run with a plow, opening a place for each row of trees. If other furrows are run at right angles to the first, very much manual labor may be saved in planting. If fertilization is necessary, this plowing may be done in the fall, and, as intimated above, manure hauled out during the winter may be thrown where the furrows cross each other. This is a good preparation for light soils. I need not remind farmers or fruit-growers that this plowing should be executed with great exactness and the final staking for the trees done afterwards. The rows are easily filled with plow and harrow.

Distance between trees: This is still an unsettled question in the minds of many planters. When the trees are small, sixteen feet seems to be quite far enough for the peach, but experience has taught most, if not all, of those who have bearing orchards, that twenty feet each way is most convenient and profitable.

Cultivation: During the first summer after planting, corn is decidedly the best crop for young trees. It gives sufficient shade to protect the bark from the burning rays of an August sun, and if well cultivated does not draw too much moisture from the fibrous roots that are reaching out after nourishment.

The secretary read the following from S. Rumery:

PEACH CULTURE.

To raise a good orchard and bring it to bearing is a great achievement well worth the careful attention of every farmer. It is of great importance to start right. In choosing a site avoid hollows, ravines, and any spongy or black land, even if well drained. Such land grows trees which are likely to be succulent

and short lived. Cold air settles into the hollows, making them colder than the hills. Choose land which is high. It may slope in either direction. There is not much choice, unless the slope is very steep. Avoid porous soils of all kinds. Do not think of setting trees in a field of clover and timothy, or in a field of wheat; and fruit trees will be injured by such treatment very much as would a hill of corn. For a good, strong orchard, which will do the owner credit, it is very important to select good, strong soil; a soil which is clay bottom is the best. If you would lay the foundation of a noble orchard, thoroughly pulverize the soil before setting out the trees. If you want to throw away your money and get cheated, buy your trees of some pleasant-spoken agent who is a stranger to you. He may offer trees cheap and even then make money. These agents are all over the State, and are doing an untold amount of injury. Who of us does not remember that sleek, smooth-tongued chap from Ohio, with his new peach called the Hopkins seedling, and his purple-leaf beech tree? His new peach was in a glass can that made it look as large as a good-sized pumpkin. I think that some of the best farmers remember whom I speak of. I think some of them remember him to their sorrow. It is generally better to buy the trees from some good nursery near home. Send directly to the nursery, or, better still, go yourself. In buying trees you may not get what you ask for. There are many risks to run, even with the best of dealers. This much of my experience I state to show that it will not always do to depend upon what a nurseryman tells you, for he almost always has "just the variety you want." In planting peach trees, set them out in the spring. The variety to set depends on what a man wants, whether his own needs are to be supplied or whether he is going to raise for the market. The location in this vicinity must be on the most elevated land. If you select such a locality, with the soil strong, you will raise the very best of peaches. A good, sandy soil does very well, but a clay soil is a little better. On the latter your fruit is finer and the trees last longer. As to distance, I would say twenty-four feet apart. You will get more baskets to carry to market and the peaches will be larger and finer colored than if your trees are closer. If a man raises peaches for market he wants about five varieties. It is of the very greatest importance for the success of the trees that the roots be not exposed to winds or sun, or dry air. Set them about as deep as they grew in the nursery. Place fine, fresh soil about the roots and pack it in closely. After you set your peach trees, plant the ground to corn the first year; in fact plant to corn until the trees starve out everything else. Corn will take the strength of ground less than any other cereal. If you leave the stalks on the ground they will keep the snow from blowing off. Now, after all these pains, and the trees have got a good start, turn in the cattle or sheep, or rent the farm. The young trees make excellent browsing for cattle. In three years you will condemn fruit raising and think it is poor business. If you know but little about raising fruit, by all means learn before venturing upon a large orchard, or you will surely lose money by the operation. If you have money to fool away, seed down a young orchard to clover or to timothy, or sow a crop of wheat or oats, or any other sowed crop. If you want the trees to thrive, cultivate well till they are five or seven years old. Always stop cultivating the trees in August, weeds or no weeds. This allows the tree to mature for winter.

Mr. Dennis Sutherland said it was now time to begin preparations for setting an orchard next year. The order for trees should now be given to the nurseryman. Get the ground ready in October. He cared for no protection on the west, but wanted all the wind through his orchard he could get. If the trees

are to be set on sod ground, turn it over in October, nicely, dragging lengthwise of the furrows so as not to turn up clods, and sow two barrels of salt to the acre. He would use the refuse salt from cured hides, which can be bought at South Haven for fifty cents per barrel. In the spring stir the land with some sort of cultivator, preparing it as for corn. Then set the trees a little deeper than they stood in the nursery row, having "healed them in" in the fall. Before setting they should be entirely stripped of branches, and left a straight stalk not more than three feet long. While they are growing, prevent the formation of crotches. Before setting, the roots should be free and straightened out. It is more convenient to have each variety set in a block by itself. He has a drive-way around his orchard, and also each way across through the center, to enable him to easily reach a wagon with the fruit. This drive-way is twenty-four feet wide and his trees are set twenty feet apart. The distance apart depends somewhat upon the kind of soil. Twenty feet is not too far on soil capable of growing good strong trees. He would not use manure about the roots when setting. The ground should be good enough to grow a tree as fast as it should be grown. As for a mulch, he would depend on cultivation to supply needed moisture. If the soil is frequently stirred about the trees the moisture will be sufficient, just as it is to corn.

Mr. Lay asked if the cultivation of potatoes among the trees was injurious to them?

Mr. Sutherland thought no man would a second time plant potatoes in a peach orchard. He had known one to be nearly ruined by that. Potatoes use many of the same constituents of the soil that peach trees do—the alkalies.

Mrs. Holton asked what was the best manure for peach orchards.

Mr. Sutherland recommended rye plowed in, salt, lime, and ashes, but nothing was equal to barnyard manure.

Mr. Sailor agreed to this, and said corn is the best crop to raise in a young orchard, though he had raised potatoes without injury to the trees, having thoroughly manured the soil.

Mr. John Dumont once raised potatoes the first year, on strong soil, without hurt to the trees; and he thought the potatoes would do no harm in such soil. He had lost trees among wheat and oats, even though he had cut the grain away from about them and used mulches.

Mr. Geo. T. Lay spoke of the comparative merits of trenching trees in the fall and leaving them in the nursery row, claiming that he would rather have trees that were left in the rows all winter, thinking them surer to grow when set in the spring. He had planted at the same time trees from each of these treatments, and had better success with those left in the row. If the trees, he said, will not stand their first winter in the nursery row, they will not endure the first winter after transplanting. In New York the trees are not trenched nor housed, but are left in the rows.

Mr. Dumont said he believed that ninety-nine per cent of trees left in the nursery row this winter would now be dead. The New York trees make a slower growth than ours, the autumn closes quickly, there is no lingering of warm weather to keep up a late growth, and the deep snows afford protection.

Mr. LaFleur contended that the plan of trenching, or healing in, was the best, because it compelled a stoppage of growth, while trees left in the row would be kept slowly growing by the warm weather. The first year's growth in the row, from the bud, is so tender that it is very liable to injury from cold, as the circulation of the sap, in the mild days of our winters, is kept up to a certain extent.

Mr. Lay claimed that he had set in the spring what are called dormant buds, and they had made large growths and lived through the succeeding winter without damage. And he claimed that if they would grow in the field and live, they would live in the nursery row. Few of our winters, he claimed,—only one in the past fifteen years,—were severe enough to kill the trees if left in the nursery, and he inclined to the belief that the nurserymen trenched the trees knowing that it decreased the chances for their living after transplanting, but determining to make the orchardists bear a part of the risk from severe winters. He thought, too, that the trenching was done so that the ground could sooner be had for a new crop.

Mr. La Fleur said that if “dormant buds” are hardier and withstand rigorous weather better than do trees from the nursery row, it is because growing out alone, and having been transplanted, they make a slower, and therefore hardier growth. Any tree growing by itself is stronger than a tree of the same sort grown among others.

“Dormant buds” are the budded trees taken from the nursery and set the spring after budding, and before the inserted bud on the seedling stock has started to grow.

Mr. Buck said the object in trenching the trees was to preserve them. If they froze at all in the trenches, they would freeze worse, and further down, in the row. The covering part way up the stalk, as practiced in the trenches, would preserve some of the lower buds of the ingrafted stock, and so save the tree, while the same weather that would kill its top in the trench would kill it below the ingrafted bud in the nursery row. There was no gain of time or land to the nurseryman; it was all extra work.

Mr. Lay held to his preference for leaving the trees in the nursery row. He would take his chances of weather for the sake of the increased vitality at time of planting.

Mr. Sailor said that at the east some advocated fall planting, but he would not practice it. He preferred trenching and covering the tops with something—evergreen boughs were good—for protection.

The damage done to trees during the past winter was mentioned.

Mr. Dumont said it had occurred on the lower lands, mostly, and he thought it was caused by the circulation of sap in warm times and subsequent freezing. Others concurred in this theory.

Mr. Sutherland said he would take trees in the fall intended for spring planting; would dig a trench across a northeast slope, put the trees in, tops down hill, cover with earth one-third their length, and let the snow drift over the tops. He preferred medium-size, straight trees. Some of the best orchards on the lake shore were grown from “dormant buds.”

May Meeting.

Insect pests received the society's attention at the meeting in this month, the rosebug, curculio, and codling moth getting the greater share.

Mr. L. A. Lilly spoke of the codling moth, giving first its natural history. As soon as the fruit forms, a single egg is laid in the blossom end of the fruit, and as soon as the egg hatches the larva enters the apple. In three weeks the larva matures, leaves the apple, and in some concealed place spins a silken cocoon, and assumes the chrysalis state. In from nine to fifteen days, varying with the temperature, the moth issues. The apples are again stocked with eggs as before, after which comes a recurrence of the work, except that the larvæ upon leaving the apple simply spin cocoons, in which they remain till

spring, when they pupate, and in about two weeks the first moths appear. The time when the first moths come forth varies from May 1 till July 1, so that moths will be issuing from May 1 till August 1, and the "worms" will be leaving the apples from the last of June till the fruit is gathered. My own experience seems to show that no pupæ are formed after the last week in August, as, so far as I have examined, all larvæ that leave the apple after that time simply spin a cocoon, in which they remain as larvæ till the next spring. Some of the observing fruit men of our State think that during the past season many of these insects pupated after that time. Such cases came not within my observation. Of those larvæ which leave the apple while it still hangs on the tree, about one-half crawl down, till beneath some bark or in some crevice they find seclusion in which to spin unobserved. Those which fall to the ground with the fruit crawl out, and if the ground is free from all rubbish, stumps, etc., they crawl up the tree and hide as before. As to remedies, hogs kept in the orchard to devour the fallen fruit were of service, but were only a partial remedy, for most of the moths crawl out before the apple falls. The plan of using bands of cloth about the trees he considered the most efficient. These bands are of woolen cloth, old or new, or any rough cloth, about five inches wide, passed not tightly about the tree and fastened at the ends by a tack. The larvæ in passing down or up the trees (which are presumed to have been previously cleared of rough bark) crawl beneath the cloth and spin their cocoons. The bands should be regularly inspected once a week and the larvæ destroyed. The bands should be on by the 20th of June and left through the season, the weekly examinations extending to the last of August, and at the close of the season they should be inspected. The tacks should be driven in the center of the cloth. Prof. Beal had found the cost of the bands and labor to be four cents per tree for 250 trees. Paper was sometimes used, but it is quite inferior to cloth.

Mrs. Holton spoke of the evil results of worm nests on trees in the highway, and thought a law should be made to compel owners of property to destroy them.

Mr. A. Lane had had good results from pasturing his orchard with hogs.

Mr. LaFleur said the first worms become moths which lay eggs. These become larvæ and stay as such through the winter. Not all these latter worms leave the fruit but stay in it through the winter. If wire screens are put in cellar windows the moths can be seen in the spring, hatched from the worms that went in with the apples in the fall, trying to escape to the trees. The best way to fight the pest is for a number of orchardists in a locality to combine in using the bands, and hire a man to inspect them regularly.

Mr. H. G. Buck spoke of the necessity of scraping off the rough bark from trees, and said the larvæ would hide beneath sticks, in fences, brush-heaps, etc. He said he once was given to shooting birds that took his berries, and the woodpeckers that ate his corn when "in the milk," but he had learned better than to do so. Now he would feed corn to a woodpecker to get him to stay with us.

Mr. LaFleur described the curculio as an insect that hibernates during the winter in the mature state. In early spring, and even later, he lies concealed under boards, clods, etc. This weevil is nocturnal, being active at night. So soon as our plums, peaches, and cherries set, the curculio, a little brown beetle, commences operations, imprinting the familiar crescent and placing an egg inside. This egg-laying continues even to July. As the weather becomes warmer the insect forsakes its habit of going down to the ground by day to

hide, but remains in the tree. These beetles are not solely engaged in pairing and egg-laying, for they are good feeders and gouge out many a hole in our fruits to satisfy their appetites. The eggs soon hatch, when the young larvæ bore into the fruit and continue to eat. As these are sometimes, though quite rarely, found in apples, I would state that they can be easily told from the codling moth larvæ, as they are without legs, thus resembling maggots. They grow rapidly to maturity, thus causing plums, peaches, and apples to fall prematurely, though cherries usually remain on the tree. The earliest larvæ are ready to go into the ground and pupate by the last of June. As egg-laying goes on even till July, it will readily be seen that larvæ will be found in the fruit all through the summer, and I have found them in peaches even in September. All of these pupæ change into mature insects during summer and autumn, so the insects all pass the winter as mature beetles, concealed either under boards or in crevices, or even in the ground. In May they commence coming forth, and continue to put in an appearance even to mid-summer. The most important question is, how shall we rid our plums of this pest? There are several ways adopted by different parties, all of which are quite effectual in their application if strictly followed. To make a sure thing of it I should adopt the following method: First, the ground should be plowed and cultivated to keep clean of all weeds or grass—the smoother the ground and harder it is packed around and under the tree, the better; I should let all the poultry run among the trees and feed them there; then smoke the trees once in four days with coal tar by burning it under each tree for a few moments at a time; then the tree should be jarred every morning before eight o'clock, and again just before dark, at evening, taking care to catch the curculio on a sheet or cloth and destroy them. If these directions are carried out strictly you will find no difficulty in growing plums so far as the curculio is concerned. Fowls will pick up both the larvæ and the beetles, but they are not a sufficient protection. Another method of capture is to place chips, boards, or pieces of bark under the trees. The beetles crawl under these and may be easily captured by day. He thought no one process sufficient—all should be employed, and then a good crop was certain. He thought the plum succeeded best on clay soils; thought the curculio preferred sandy or gravelly soils. He knew a man who laid a floor of cement under a plum tree and frequently jarred it, and, sweeping up the curculio, got good crops of fruit.

Mr. Lilly said that at Mr. Jewett's he had seen two plum trees on heavy soil; one stood in grass, and every plum was stung, while about the other the grass was cut away and the fowls fed there, and it was full of fruit. So they did not dislike clay soil. He had seen peaches badly rotted because of curculio.

Mr. Sailor said Mr. Dyckman of South Haven found the curculios very damaging to Hale's Early peaches, but kept them down by the chip process.

G. W. Lonsbury had known plum trees to be protected and bear large crops of fruit by throwing into them wood ashes when the dew was on.

The secretary read the proceedings of the South Haven society when considering this subject, by which it appeared that most members favored the jarring process. This is best effected by sheets, from 4x4 to 9x9 feet in size, according to size of trees, mounted on frames and carried by two men, or mounted on wheels, as a barrow. A slit in the cloth admits the tree to the center. A rap on the tree causes the beetles to fall (they feign death on the slightest disturbance), when they may be gathered up. The mounted sheet may be in circular form, and should sag to a point. If below this a tight box is fixed the beetles may be easily shaken into it, and every one captured.

Mr. H. G. Buck began discussion of the rose bug. He said they appear in June and July; eat most ravenously, seeming to relish rose leaves, grape leaves, and even cherry leaves. After this wedding feast is over, the females lay their eggs in the ground. The grubs feed on the roots of plants, but are not sufficiently destructive to attract attention. The pupæ may be found in May, and in June the beetles come forth again to their work of plunder. As this beetle will, like the curculio and blister beetles, fall from the plants whenever disturbed, they may be shaken on to sheets placed under the vines, and destroyed, but their great numbers had, in his experience, rendered any plan for their destruction of no avail. They "struck his place" about five years ago, and as a result he had rooted out nearly all of his 300 fine grapevines. They appeared in myriads from the 8th to the 12th of June, eating the blossom and young fruit of all the grapes, as well as the leaves of the Clinton. They also ate the leaves of the small, sweet, light-colored cherry. They swarmed like the potato bug, and act and look like it, except that they are smaller. They work on peaches, and he had found as many as fifty in one hole they had eaten out of a peach. They eat only the best yellow peaches, but so far they had not done serious damage to that fruit. They also eat blackberry and black-cap raspberry leaves, will eat into such apples as the Snow, Rubicon, and Wagener; he has known them to thrive in large numbers on clover, and they seem to prefer light soils. He considered them great pests, although their stay is short, coming about the 10th of June and going in July. He had tried dusting with white hellebore without effect; thought Paris green would kill them; should try it on peaches this year if they gave trouble, but it was difficult to apply such remedies to the grape and perhaps dangerous.

June Meeting.

Discussion was also had upon fruit packages—prices and sizes deemed best—and upon thinning peaches; but nothing particularly new was developed.

This meeting was held at the residence of Mr. G. T. Lay, in Monterey township, where the society was most agreeably entertained by the host and hostess. Owing to the cloudy appearance of the morning, the attendance in the forenoon was small, and the meeting was not called to order; but after partaking of a sumptuous dinner, proceedings began, Mr. H. G. Buck taking the chair. On account of the absence of the secretary, L. A. Lilly was appointed to take the minutes.

The first subject for discussion was "The best strawberry for family use and how to raise it," which was opened by Mr. Lilly, who had on exhibition specimens of the Wilson, Crescent Seedling, Chas. Downing, Kentucky, Monarch of the West, Col. Cheney, Seneca Chief, and Seth Boyden. Mr. Lilly said the Wilson is too familiar to need any description. It is the berry generally grown for market, but for family use it should be allowed to stay on the vine until fully ripe. The Crescent is a scarlet berry, beginning to ripen a few days before the Wilson, and is a large bearer. It lacks a little of being first quality, and is rather soft. The Chas. Downing is a berry of the first quality, but does not hold its size well and is only a moderate bearer. The Kentucky is a late berry, and is used to continue the season. Monarch of the West attracted a great deal of attention on account of its large size and excellent quality. It is not prolific and needs good care, but will repay the amateur for his trouble. The Col. Cheney, Seneca Chief, and Seth Boyden are berries of good quality for the table, but are not large bearers. The strawberry can be raised on almost any kind of land, but seems to flourish best on a sandy loam that has been well

enriched and thoroughly cultivated. The plants may be set in the spring or early fall, as is most convenient, but the spring is the safest time, and then a good crop will be gathered the next season. If a horse is to be used in cultivating, the rows should be three feet apart and the plants fifteen to eighteen inches apart; but where the hoe only is to be used, the rows may be two feet apart or even less. The strawberry bed should be thoroughly cultivated through the season, and the runners kept cut off. Late in the fall cover the bed with straw, and allow it to stay on the bed until the fruit is gathered the next season. The strawberry is managed in a variety of ways, but the plan just described will insure a good crop of first-class fruit, which is the object sought for.

Mr. Buck said he did not believe that one farmer in ten had a bed of strawberries or raspberries, but he wished they would set one out, take care of it, and then, and only then, could they realize the enjoyment to be obtained from these luscious fruits. He also urged the women to insist upon it that their husbands set out a strawberry bed.

Mr. Warner said that fruit was a large item in his diet. He renews his strawberry beds once in three years; prepares the ground by summer fallowing and enriching; sets plants in August or September and gets some fruit the next season. He has the Monarch, Chas. Downing, and the Wilson. He showed how the farmer could have fruit on the table almost every day through the year, by having strawberries, cherries, raspberries, blackberries, peaches, grapes, pears, plums, and apples, each in its season.

Mr. Rumery: All the strawberry growers were on sandy land; did not think clay soil would produce a berry of good quality.

Mr. Warner: Quality on a very hard clay is not apt to be first-class.

Mr. Buck: This year we get size but poor quality, on account of the wet weather; quality is better in a dry season.

July Meeting.

The matter of transportation charges from Allegan to Chicago was first considered, Mr. Sailor saying that while last year the G. H. railway and steamers had carried peaches to Chicago for eight cents per basket, they this year had announced their intention of charging fifteen cents. On a shipment the other day this had made a difference of \$1.68 to him, and for the season would make a difference of more than \$120 to him over his last year's rates. After some more discussion, Messrs. Dumont, Sailor, and Lay were appointed a committee to confer with the express and railway companies as to freight charges, they to publish their report.

Mr. Sailor said he would this year ship in fifth-bushel baskets, four in a crate. Buyers liked the crates, as the fruit went through without jamming. They are so heavy that train and boat men cannot throw them about, yet they can be easily handled. The crates contain four baskets and are made of light stuff. They cost four and a quarter cents per basket; with crate and tarlatan, will cost a cent more per basket. The crates come in parts, but it is slight work to put them together. They are made in Muskegon and Douglas, and are an unpatented invention of Messrs. Williams and Weed of the latter place. Mr. Dumont said he was advised by Muskegon parties that if 20,000 or 30,000 were taken at once a discount of ten per cent from above rates would be made.

Mr. Sailor recommended pasting the tarlatan to the baskets instead of sewing, as a quicker way and as good.

Mr. Dumont exhibited a lot of Amsden or Alexander peaches, excellent specimens in every way.

Mr. M. T. Smith of Hopkins, showed some Early Beatrice affected with yellows; also branches of the Early Crawford, both with yellows and in the healthy state. The former appeared ripe nearly two months in advance of their time, while the latter were still small, green, and hard. The contrast was very marked, while the opportunity to note the effects of the disease was a good one.

Tarlatan was explained to be a French-made material, Field, Leiter & Co. of Chicago, having it made to order in Paris. It is sold by the piece at \$1.65, each piece making about 180 covers. It is made of a special color, which apparently heightens the color of the peaches, both the red and the white or yellow parts. Its use, except as a slight protection from spilling and from thievish fingers, was admitted to be a harmless piece of rustic delusion, justifiable on Barnum's famous assertion that the American people like to be humbugged.

Mr. LaFleur read a paper upon "High or low heading of peach trees," in which he favored the latter method of growing them. He held that by nature the peach is a shrub or semi-dwarf tree, and should be grown according to its natural habit in order to obtain the best results. It may be pruned and made to assume a different form, but, left to itself, it always throws out branches from very near the ground and makes a round, uniform head having a main stem, somewhat like the spruce. Trees grown with high heads—*i. e.*, trimmed free from branches up to several feet above the ground—are quite likely to have crotches and consequently to split or break down; the trunks are more liable to bruises during cultivation, and are more exposed to severe weather. The "black ring," which killed so many trees last winter, was caused by alternate freezing and thawing of exposed trunks. It in nearly every case occurred between the limbs and the ground. Trees with such exposed trunks are often found dead and rotten on one side, from the limbs to the ground, while trunks on which limbs are allowed to grow out from near the ground are found to be in healthy condition.

Mr. Smith thought heads from $1\frac{1}{2}$ to $2\frac{1}{2}$ feet from the ground were best. His neighbor trimmed his trees up to four feet or more, and, as a result, they blew about a good deal and crowded the earth away from their roots. The neighbor lost several trees, but none of Mr. Smith's low-headed trees perished from that cause. Low-headed trees, he thought, had the stoutest trunks.

Mr. Buck said the peach could be trimmed into conical form as easily as the spruce. He called high heads from four to five feet from the ground; low ones, anything from two feet down. Trees with low heads do not crowd the earth away, as do high ones, and so are not so liable to winter-killing of the roots.

Mr. Stegeman thought from eighteen to twenty inches the right height for the beginning of the head; such trees would sway less and grow more stocky; and he preferred the same method of growth for the plum and pear, his experience showing ill effects from allowing these trees to head high.

Mr. Sailor thought three feet about the right height to keep the limbs from the ground.

Mr. Buck thought picking easier but cultivation harder among low-headed trees; that high-headed trees were more apt to fill with small branches. He asked Mr. Stranahan which bore earlier, Late or Early Crawford, and was answered that the latter was the earlier bearer. Mr. Buck said his Late

Crawfords, trimmed low, now bear largely, while the Early ones, trimmed high, as yet bear sparsely.

Mr. Stranahan said he had 600 three-years-old trees which as yet had not been pruned at all, and they are the handsomest he knows of. He would not head a tree higher than two feet; the tree has a strong tendency to grow like the tamarack, a central stem with many lateral branches.

Mr. Sailor cuts back some, but thins out more; forms his heads three feet from the ground; swaying is caused most by tops too heavy for their trunks; thin out the tops so the wind can get through and there will be no swaying.

Mr. Lay favored low heading as affording stout trunks, large heads, ease of harvesting, and healthy condition; he practiced cutting back long limbs, which he found chiefly on north and east sides.

Mr. Smith broached cultivation. Mr. Buck would raise corn for the first three years, and then nothing, as the trees will require the full strength of the soil. He had cultivated raspberries between the peach rows, but corn was best. Some years the ground may be tilled later than others. This year there has been a great growth of wood, and he would not cultivate any more, but allow the growth to stop and the wood to ripen. Last year cultivation was carried on till the first of August with good effect.

August Meeting.

Despite a cloudy and threatening day, about sixty gentlemen and a third as many ladies met at the home of Mr. and Mrs. J. B. Dumont, on Tuesday, to take part in the August meeting of the County Pomological Society. Other meetings held at that pleasant spot had been successful, but this, for several reasons, was the largest gathering the society ever had; for besides the hospitality of the house and its pleasant surroundings, this was to be the occasion for

A VISIT

from the Grand River Valley Horticultural Society, its representatives coming to learn what they could of yellows—and the subject of "Varieties" was also to be discussed, making two subjects of utmost importance to the fruit-grower.

GRAND RAPIDANS.

The party of gentlemen from Grand Rapids was much larger than had been expected, but no greater than had been well provided for. They came to Allegan and went thence to Mill Grove and were taken in wagons to Mr. Dumont's. There were eighteen,—Messrs. S. L. Fuller, J. M. Dean, W. K. Munson, C. E. Knapp, Geo. Edison, R. D. Graham, Wm. N. Rowe, S. M. Pearsall, N. Cummings, E. Swartz, D. Koon, P. W. Johnson, H. R. Pierce, L. A. Paine, W. H. Anderson, J. M. Shafer, E. C. Phillips, and C. W. Garfield, Secretary of the State Pomological Society. They were accompanied by C. C. Sexton of the Grand Rapids Democrat. Mr. T. T. Lyon, President of the State Society, was also present, and some of the members of our own society came from a considerable distance.

THE FRUIT EXHIBIT

was quite varied as to peaches, sixteen or seventeen varieties being on the table. There were Early Crawfords, Hales, Yorks, the Foster, Barnard, Mountain

Rose, Cole's Early, Stump-the-World, Walter's Early, Snow's Orange, George 4th, May's Choice, and a seedling from the Early Crawford grown by C. Engle of Paw Paw, and by him named President Lyon. In glass jars, in a solution of boracic acid, were large Early Yorks, Stanwick's Early York, and Cole's and Hale's Early, being thus preserved for exhibition at the State Fair. Besides these there were Imperial Egg and Duane's Purple plums, Transcendent Crab-apples, and Lawton and Kittatinny blackberries. All these were excellent specimens of their kind, and their pleasing odors, brilliant colors, and delicious taste were almost equally enjoyable.

The forenoon was devoted to

STROLLING, VISITING,

and talking of almost every pomological topic in an informal way. Many examined Mr. Dumont's peach orchard of several thousand trees, covering forty acres, the oldest of them having been set but five years, and some of them are but two years old. Many were laden with heavy crops, and, where the fruit was gaining its color, presented a beautiful appearance.

At noon the company gathered about table in the house, or sat beneath the trees, and enjoyed a bountiful spread of good things provided in part from the baskets, and in part from the generous larder of the hosts.

NO YELLOWS

could be found on the premises. But the seekers after evidence of that disease were not disappointed, for samples of infected fruit and twigs, and one whole diseased tree, were brought for examination, and were handled, cut and gazed upon with mixed feelings of curiosity and dread. None of the visitors cared to carry any mementoes of the disease home with them. But each one became satisfied that he could hereafter know yellows upon seeing it; and we have little doubt that with his new light he will not have to search far about home before making unpleasant discoveries.

DISCUSSION

of pomological topics certainly may be endless; the whole tale never will be told, and some topics bear verbal fruit more plentifully even than trees do peaches. We have heard this yellows question debated more or less for the past three years, and no one seems ever to tire of it, save the humble scribe who sweats over his task of inditing the voluminous "idees" of each speaker. This time, however, one man did most of the talking. They got President Lyon—patient soul that he is!—upon his feet and plied him with questions ceaselessly for more than one hour. Mr. Fuller acted as spokesman for the Grand Rapids men, and began by asking if Mr. Lyon knew of the existence of yellows anywhere between here and the Atlantic coast, and how it came here. As to the latter Mr. Lyon said, "I don't know." Trees have been imported from points west of New Jersey and east of St. Joseph, which afterward had yellows, while young, but it is hard to say that the disease came from any definite place. Recently he received a work from Pennsylvania, and it speaks of yellows there. He once received some trees from Georgia that showed yellows the first year in the stock, below the bud, showing the original tree to have been affected. The talk that there is no yellows here or there usually is the result of ignorance of the disease on the part of the person reporting. He thought there was less yellows at the far south. The disease has been known in the Delaware region

for the past one hundred or one hundred and fifty years, but they still grow peaches there. He had heard that western New York was free from yellows, but last winter he had letters from Hamilton, Ont., saying that peaches with yellows had been imported there from New York and the disease was spreading. Last winter he saw yellows near Rochester, and saw that the commercial orchards there were being ruined by it. The claim that they don't have it there is false. He did not think yellows develops in the nursery, except from diseased stocks. He could not tell the origin of the disease. The men in western New York do not know how to treat it; thought they did not take the trees out, and he did not know that the practice of taking them out was practiced anywhere but in Michigan. In Delaware they consider that a peach tree has passed its point of profitable bearing when it is five years old, and they then root them out and plant anew. The first appearance of yellows is sometimes in the diseased yellow growths, and next in the prematurely ripened fruit, but usually it is in the fruit first. Young trees set last spring may show yellows this season, it having been dormant in the nursery and developed by the shock of transplanting, or it may remain dormant until brought out by the labor of fruitage. The diseased growths oftenest come from where otherwise there would be no buds, and the diseased buds appear in the wood of the year in which they originated, not extending to the pith. Diseased pits will grow sometimes, but where the tree has yellows to a great extent the pits usually have no germs. Mr. Lyon had once obtained a lot of almonds from what he presumed to be a perfectly healthy tree, but the young trees soon showed yellows, and on examination the old tree proved to be likewise diseased. When he finds yellows in a young tree below the bud he presumes the stock to have been diseased; if above the bud, in the first year, he presumes the bud to have come from an infected tree. At South Haven the growers have practiced uprooting diseased trees. This has resulted in controlling, in a measure, but not eradicating the disease. There was not much yellows there until after the severe winter of '74-'75, when about five per cent of the trees was found diseased and taken out. Afterward, until this year, there was very little of the disease manifest. This year the disease shows an increase. Last fall there was a long time of warm weather, in which the nursery stock started into new growth. There came a "cold snap" with snow for about a week, after which discoloration of the wood was noticed. Mr. Lyon thought the increase of yellows this year due to the unfavorable weather of last fall and winter, but was not certain of it. It is certain, however, that disease spreads more readily in animals and plants that are debilitated by unfavorable conditions. He advised the rooting out of all trees having yellows. Much of the destruction of trees at St. Joseph was due to the severe winters, but most of it was caused by yellows. Mr. Dyckman, of South Haven, has yellows in his orchard, but it does not ruin his business. He is reported to have an annual income of from \$8,000 to \$12,000 per year from his peaches. He says that when he takes out one tree he plants two. He takes them out and burns them, planting a fresh tree in the vacant place. Mr. Lyon would fear to do so, but Mr. D. has been in the business about eighteen years and is successful. Varieties do not differ as to liability to yellows; nor do soils cause it, one more than another, except as they influence the general condition of the trees. It is universally conceded that the most vigorous trees, on the best soils are as liable to the disease as any. The question was asked: Is there any value in a peach tree after it is affected by yellows? Mr. Lyon's answer was:

There is more value in its absence. It is impossible to detect yellows with certainty except when the tree is in leaf. Yellows is contagious and will infallibly spread, but not always to the next adjoining trees; and it will surely spread by pruning unless the shears be cleaned in carbolic acid after the cutting of each tree.

Secretary Garfield said Mr. G. S. Woodard of Lockport, N. Y., put out thirty acres of peach trees a few years ago, and now he is taking them all out, before having got a crop, all being diseased with yellows. He thinks they must stop raising peaches there. Mr. Garfield first saw the St. Joseph region in 1871. The orchards then were almost everywhere, the peach trees being among the apple trees, each about twenty feet apart. Now there is scarcely one left. The growers there say the yellows did the work of destruction, and they are now trying to get the trees all out and begin anew. He had found yellows in isolated places in Cass county, where there were a few trees on each farm, all having yellows.

Mr. Fuller said that when, several years ago, the committee of the State pomological society was ready to report to the legislature upon the condition of the peach orchards at St. Joseph, and recommend a law requiring removal of the trees, the St. Joseph people protested, saying such a report would ruin their market; and they thought they could cure the disease. The report was withheld; they tried to cure, but with what result we now see.

Mr. Sailor thought the winters more than yellows had killed the St. Joseph peach orchards, as they are often much more severe than ours. One orchard of sixty acres, over there, was killed in one year—yellows don't work like that.

Mr. Lyon said that as to how yellows is communicated by an affected tree to trees at a distance, there were many theories, but nothing is absolutely known of it. The disease of course affects the blossom, and pollen, carried by bees, would be likely to produce yellows. It might be carried to one or more blossoms on a tree or to many. Thus a single twig may be affected. But this is only a possible explanation, though the possibility has been demonstrated. A tree can not escape if even one peach becomes diseased; it will die in two or three years.

Mr. T. W. Sithes of Millgrove showed branches of the Morris White, with fruit both in a normal state and affected by yellows, from the same tree, and asked Mr. Lyon if he should cut out the tree. He was advised to do so. Mr. Sithes then stated that last year the yellows commissioner found on one of his Early York trees a twig, the fruit of which he said showed yellows. Mr. Sithes said he cut the twig off, and this year the tree was as healthy as any in his orchard.

Mr. Lyon said the twig *might* not have had yellows; would like a patent on the process of cutting out if it would cure yellows, and he thought if yellows was in Mr. Sithes' orchard, he was doing a dangerous thing for himself and neighbors by allowing it to stay there.

Mr. Smith of Hopkins told how he had cut off limbs affected by yellows, and soon afterward the fruit in other parts of the tree showed the disease.

Mr. Dean of Kent county had cut out of a tree exhibited on the ground, some of the yellows sprouts, and reported that he found them not to reach the pith but to originate in the wood of one or two years back.

Mr. Lyon said all the yellows buds are so. They extended into the branch only as far as the wood originating the disease; all such are adventitious buds; all buds of the first year's growth extended to the pith.

PROFITS OF A PEACH ORCHARD.

President Lay spoke of the wonderful advantages of this region for the production of peaches, and urged organization of the growers as a means to advance their interests, both as to growing and marketing. He stated that several years ago he set out about four acres of peach trees. People laughed and said he was making a place for boys to go "cooning." His crop of 1874 repaid the cost of planting; in 1875 no crop was borne, but no trees were lost from the severe winter; in '76 he got \$300 for the crop, besides having enough for home use; in '77 he got \$500; in '78, \$800; in '79, \$1,000, and the purchaser did his own picking; and this year he reserved some of the trees and sold the fruit on the rest for \$800. This was the gain from less than four acres. In conclusion, he said, "I tell you, gentlemen, there's a mine of wealth in every one of these hills."

VARIETIES.

Mr. H. G. Buck would plant for a succession through the season, from the Amsden to the Smock. He would plant the Amsden, Beatrice, Hale's Early, George IV., Foster, Early Crawford, Barnard, Old Mixon, Late Crawford, and Smock.

Mr. La Fleur would plant, as most profitable in their season, the Amsden and Alexander, between which he had discovered little difference, both being good; the Beatrice is too small; the Early Louise is a little larger and good—was his next choice to the Amsden, but would not set many; the Early Rivers has a good color, fine flesh, and bears when very young; Hale's Early is good if on proper ground—if set on clay or heavy ground it is likely to rot on the trees even without the curculio's ravages; the large Early York has white flesh, red cheeks, is hardy, grows well, and brings a good price, but if there were a yellow peach ripening at the same time it would take the Hale's place; the Mountain Rose comes next, a very handsome, red-cheeked, and rapid-growing peach; the Honest John, Yellow Rareripe, Barnard, and Early Crawford ripen at about the same time, the Rareripe being a little the earliest; the Early Crawford heads the list of the middle season peaches, for which a heavy soil is best, and it brings a good price even in competition with all the peaches from the east and south; the Foster is a little later than the Early Crawford and looks much like it, but has a deep, dark red stripe; the Old Mixon has white flesh, and is one of the oldest known varieties, and always brings a high price because of its fine quality; the Jacques Rareripe is good and does best on light soil, and the Barnard does better than the Early Crawford on light land; Stump-the-world is white with a slight flush; the Susquehanna is of excellent quality but a shy bearer; the Late Crawford is one of the best peaches we have for market, doing best on heavy soil and being a shy bearer when young, but doing well when older; Hill's Chili comes next but is liable to be affected by dry weather, and so ripen earlier—is very hardy, does as well on sandy land as any, needs thinning, and though it may not sell as well as the Late Crawford, there is more money in it the first ten years; the Smock is as late as any peach that will ripen here every year, is hardy in bud and wood, and brings as high a price as any. He had found a seedling growing upon F. Granger's land, in Monterey, which was larger and finer than the Late Crawford, one of the best peaches he ever saw. He had budded from it. Budding from trees bearing unusually large fruit of their kind caused new trees of the same characteristic. Snow's Orange is an improvement, simply, on the Barnard, and probably is a seedling from it.

IN SETTING AN ORCHARD

of 1,000 trees Mr. La Fleur would choose varieties in the following proportions:

Amsden.....	25	Old Mixon.....	25
Early Rivers.....	25	Late Crawford.....	200
Hale's Early.....	25	Hill's Chili.....	200
Early Crawford.....	200	Smock.....	200
Richmond.....	100		

Mr. Fuller gave a list of 2,800 trees in the orchard of Mr. Ed. Swartz of Sparta, Kent county:

Alexander.....	50	Jacques Rareripe.....	50
Beatrice.....	75	Early Crawford.....	600
Louise.....	25	Barnard.....	600
Hale's Early.....	200	Reeves' Favorite.....	50
Early York.....	100	Late Crawford.....	600
Foster.....	50	Hill's Chili.....	200

Messrs. Munson & Knapp of Grand Rapids, nurserymen, have set an orchard to the following named varieties:

Alexander.....	300	Snow's Orange.....	300
Hale's Early.....	200	Late Crawford.....	350
Early Crawford.....	500	Jacques Rareripe.....	150
Barnard.....	500	Hill's Chili.....	800

Mr. Brownell asked how he could save his Hale's Early from rotting. Mr. Lay said curculio was the probable cause, and in dry seasons they work upon this variety disastrously.

Mr. Shirley said an old peach-grower of the lake shore had advised him to plant, for profit, Late Crawfords only.

Mr. Lyon was asked to name

VARIETIES BEST FOR HOME USE.

He said many kinds that were good for bringing in the dimes had little value for the table. The Late Crawford was good to sell but not to eat, and so are half the others. Peaches are largely raised to sell by sight, because people buy by sight. Many of the best peaches are not profitable at all. Every one would want a few Amsdens or Alexanders; their fruit is the same but the trees differ, the Alexander being the stronger grower, and its fruit is a little redder. The Beatrice, Louise, and Rivers may be grown to a small extent for family use, but they are too delicate for the market. He would plant one or two trees each of George IV, Coolidge's Favorite, Early Rareripe, Stump-the-world, and Late Red Rareripe, the latter being the very best of peaches. The Smock is good, and so is Beers' Smock, which is larger and of good quality. The size of peaches in many orchards depends on the owner's fingers. The best peaches and the most money may be got by thinning to five, six, or eight inches apart, according to the strength of the trees.

The time approaching for the departure of the Kent county guests, Mr. Fuller presented their thanks to the society, and to Mr. Dumont personally, for the favors received, the information given, and the hospitality extended. The day had been an era in their lives, a day of a white mark, and he invited the Allegan society to some day return the visit.

On motion, Mr. L. A. Lilly was authorized to represent the society at the State fair with a collection of fruit.

December Meeting.

The officers of the preceding year were re-elected.

After listening to a report of the state society meeting at Ann Arbor, by Mr. LaFleur, it was proposed that leading growers present should tell of the prices obtained for peaches this season.

Mr. Buck said he had "a very good thing," selling few peaches for less than \$1 per bushel—got \$1.40 for some—retailing them in town. He sent three lots to Chicago. For the first he received nothing over costs; for the second, 80 cents per bushel; for the third, \$2.10 per bushel, making the whole average over \$1. The latter were Late Crawfords.

Mr. Sutherland shipped from South Haven. He got very good prices—45 cents per peck basket—for Early Crawfords. His Old Mixons brought 50 to 60 cents per basket. The Late Crawfords brought 75 cents, and Smocks, sent by others, sold even better. He believed good cling-stone varieties were profitable; had with some trouble secured trees of the Lemon and Orange Clings. He had an Old Mixon tree which looked worthless from age, but a year ago it bore 15 baskets of fruit which sold for 50 cents each. He shipped 21 baskets of frost peaches (seedlings), and got 50 cents per basket for them. A great obstacle to success at Douglas was the irregularity of the boats. He knew of a man who received but \$40 from a shipment of 1,050 baskets, because of the boat's delay in getting to Chicago. At South Haven no such difficulty existed. Some Late Crawfords sent from South Haven netted \$1.25 per basket. He had six old trees with yellows, last year, but no young ones were so affected.

Mr. Dumont received good prices for his Amsdens, which he began to ship about the middle of July. During the glut in the market he made shipments of Early Crawfords, Barnards, and Fosters, sending three large lots. The first brought 80 cents, the second 60 cents, and the third 28 cents per bushel. All others brought fair rates, and the average returns from the 600 bushels shipped was \$1 per bushel—net, except cost of picking and packing. These were mostly from 200 five-year-old trees—a few from three-year-olds.

At the next meeting, a premium is offered for the best exhibit of five varieties of market winter apples, and discussion will be upon merits of the several sorts.

A committee of three was appointed upon nomenclature, in order to secure names for several valuable seedlings known in this vicinity.

Owing to the press of the season's work, the prevailing political excitement, and other causes, no meetings were held in the months of September, October, and November.

The exhibits of fruit by the society, or members in its name, were two—one by Messrs. G. H. LaFleur and J. B. Dumont at a society fair in St. Louis, Mo., and one by Lyman Lilly and Karl Jewett at the State fair. The former received a first premium of \$50 upon a collection of peaches in solution (early varieties preserved in boracic acid), and a collection of apples contributed in part by them, received a second sweepstakes prize of \$150, the Grand River Society and Mr. Bidwell of Plymouth, Mich., being the other contributors; but so far the concern has failed to pay the money awarded.

At the State fair our exhibitors received the second premium on collection of fruit, second on collection of apples, second on collection of peaches, first and third on single variety of peach for market, first on single variety of apple for market, second and third on six varieties of market apples, first on Northern Spy, third on Baldwin, first on Westfield Seek-no-further, second on Bailey Sweet, and third on Golden Russet.

SAUGATUCK AND GANGES POMOLOGICAL SOCIETY.

PREPARED BY BYRON MARKHAM, SEC'Y.

OFFICERS FOR 1881.

President—Rev. J. F. Taylor.*Vice Presidents*—Alexander Hamilton, Levi Loomis, J. H. Bandle, Wm. Corner, P. Purdy, N. W. Lewis.*Secretary*—Byron Markham.*Treasurer*—J. S. Owen.*Directors*—J. P. Leland, S. R. Lewis, A. Hamilton, H. L. House.

The report of the proceedings of the Saugatuck and Ganges Pomological Society for the year 1880 will have even less of a public interest than usual, on account of its discussions being confined more particularly to subjects of a local interest. But one essay has been read during the year.

The first December meeting, 1879, discussed the subject of varieties of peaches.

Mr. H. L. House recommended especially Jacques and Hill's Chili on sandy land and Late Crawfords on heavy soil. Barnards did well on heavy land, but were not profitable for market. Some of the very early varieties were proving profitable where they did not rot, but this they were very apt to do. Rev. J. F. Taylor inquired if the Jacques were large enough to compete with other varieties ripening at about the same time.

Mr. House: Yes; as they ripen just after Early Crawfords.

Mr. Taylor thought we could judge somewhat by the sales of trees by nurserymen. The varieties called for now ought to indicate the opinion of planters. Mr. Hamilton said this would be no criterion, as very few planters really knew what they wanted. Mr. Purdy thought the great difficulty was to get what you bought. He had three varieties of trees, all bought for Jacques—some excellent and some worthless. Mr. Owen's Jacques were good, fair, yellow peaches, with red flush, and were good bearers. H. E. Graham had Jacques Rareripe which ripened with latest of Early Crawfords, medium size, etc., but did not want any more of them; would continue to plant, as he believed the market would increase with the production.

Mr. Hamilton believed it quite possible to overstock the market. The Secretary said that according to the report of T. T. Lyon, in 1877, the St. Joseph region produced and sold more peaches than the rest of the lake shore, and notwithstanding the fact that many of them were affected with the yellows, they found a ready market at fair prices. There have been times when they have shipped more peaches than are now sold from the whole of Western Michigan. If we take into account the great increase in population and wealth west of us, and the great improvement in the times, it does not seem as if the market would soon be overstocked. Mrs. Woodhull said we were small growers yet as compared with Maryland and New Jersey. They continued to cultivate the peach, and made it profitable. Some one suggested that they had larger and better markets. The Secretary said that while this was true, they were as good as they would be, while ours had just begun to develop. Mr. Taylor

inquired which had paid best generally, early or late peaches? Mr. Purdy said the medium ones had paid him best; Old Mixon free was his most profitable variety. Mr. Taylor inquired what difference there was between Old Mixons and Stump-the-world. Mr. Cummings said there was but little difference. He made a collection for the meeting of the State Society at Saginaw, among which was Old Mixon and Stump-the-world. They were mixed up in going, and he could not tell which was which. He arranged them as best he could, and no one disputed his names of varieties. Secretary said nurserymen in their descriptive catalogues made the difference in the time of ripening, the Stump being the later peach by about two weeks.

Mr. Thos. Gray had some excellent and profitable peaches, bought for Old Mixon free; Mr. Hopkins of South Haven, a practical nurseryman, had examined them, and pronounced them Sweetwater. He had others, also bought for Old Mixons, but entirely different and quite inferior, which Mr. Hopkins pronounced genuine Old Mixons. After the Sweetwater (if that was their name), he preferred the Smock. Hill's Chili had not been successful with him. Mountain Rose was a fine peach, but small. Preferred Hale's Early; believed them to be more profitable. The Rose ripens right after the Hales.

With regard to over production, he would say that in the township of Saugatuck, there were 1,200 acres set to peach trees, and 400 acres in full bearing; when all were in full bearing, it would make 120,000 trees, which at five baskets to a tree, would make 600,000 per year, for this township alone. It is estimated that there are 600,000 trees in western Allegan and Van Buren counties, which at the same rate, would give an annual production of 3,000,000 baskets. If we could have the market to ourselves, we would still be all right, but if the rest of the State can produce a like amount, he did not know what could be done with them. Mr. Hamilton was very much interested in this discussion. It pointed out the danger of depending too implicitly on names, and showed the necessity of care on the part of both fruit growers and nurserymen. Nurserymen were often blamed about varieties, when perhaps they furnished the varieties called for, as understood by them.

Mr. Hamilton moved, and it was voted, that the President appoint a committee of six to represent this society at the meeting of the State Society at Allegan.

The president appointed Byron Markham, Thos. Gray, J. S. Owen, A. Hamilton, and P. Purdy. The committee were instructed to oppose any change of name for the State Pomological Society.

January Meeting, 1880.

The subject of fertilizers was discussed. Mr. Loomis, of Ganges, said many were setting out orchards on poor and worn-out soils, and believed they would regret it. Too much was required of the land. Such land might bring the trees up to the time of fruiting but would not give good results in the quantity or quality of fruit. Fruit grown on such land was very apt to drop before it was ripe.

S. R. Lewis said he had noticed orchards planted on poor soil, but had not noticed that fruit dropped any more than on other trees.

Mr. Loomis said that on his farm, where he had planted trees on exhausted soil, the trees had not done well, and as soon as they arrived at fruiting age bore light crops of inferior fruit. The old trees on the same soil did better than young ones. It required just as good soil to raise fruit as it did to raise

oats, wheat, corn or any other grain. Another thing: the plan of filling up old orchards, where the trees had died out, with young trees, had been a failure with him.

Mr. House agreed with Mr. Loomis in this respect. His theory was that the roots of the remaining old trees so thoroughly occupied the soil as to leave no room or sustenance for the roots of the young trees.

One inquired how far the roots of old trees would occupy the ground. Mr. Hamilton said from 18 to 20 feet from the trunk of the tree, and perhaps more.

N. W. Lewis would like to hear the experience of other fruit-growers on the subject of fertilizing orchards. For his part he did not think the dropping of fruit should be attributed to sterility of soil. He knew of very many orchards planted on poor soils that had borne good crops of fine fruit for a series of years. Believed that a forced growth was fully as likely to cause fruit to drop as poor soil. Believed in thorough cultivation for young trees in fore part of season, but none after about the first of August, when a crop of buckwheat could be grown and allowed to rot on the ground to good advantage to the land.

Mr. Ehli said that on portions of his farm the hardpan was not more than two feet below the surface, and asked if such soil was adapted to orchards.

S. R. Lewis said that such soils would *do* for orchards, but would advise shallow planting, especially on low lands, as the drainage was so imperfect as to endanger the life of the trees, and as the roots could not penetrate the hardpan, would most likely be short lived.

Mr. Wiley had had some experience in using fertilizers, and he thought there was but little of our soils, if properly drained, but that would bring a young tree up to the fruiting time in a healthy condition, and thought that many of our young orchards were injured by over-fertilization. In his orchard he had used wood ashes, and the refuse from the tannery. Had confidence in wood ashes and lime on sandy soil.

President Taylor agreed with Mr. Wiley in the use of fertilizers on young orchards, and was convinced from his extensive observations that more harm than good had been done by their use.

He had seen limbs frozen bare for two feet, and yet bearing fruit on the same limb. This was conclusive to him that time enough was not given the trees to fully ripen up the wood, as it was a well known fact that ripe wood would stand many more degrees of cold than fruit buds. Trees planted where hardpan was so near the surface might do well for a few years, but unless some means of thorough drainage could be had, they would die out before they were of any profit to the owner. The kind of fertilizers to be used should be thoroughly inquired into by the fruit-grower.

N. W. Lewis inquired if the hardpan referred to was a tough, hard clay, or a sort of sand and iron mixture, hard as stone and apparently impervious to water?

Mr. Taylor replied that the iron and sand mixture was what he referred to.

The February meeting was devoted to the subject of insect enemies of fruits.

The codling moth was first taken up. Mr. Levi Loomis was experimenting by plowing his orchard as soon as the small apples began to drop; his theory was that by burying the apples the worms which they contained would be smothered and die. His experience of last year was entirely satisfactory, and he believed if he persevered he would, in the end, be successful. The late Dr. Goodrich, who had been one of our most intelligent and successful experimenters in this direction, said at the last pomological meeting he ever attended,

that we must divide the apple crop with the codling moth. He had little faith in the efficacy of bands; they were first used in western New York, and much good was anticipated from their use, but to-day very few bands were used in that vicinity, and even the inventor of an improved band, which he thought of sufficient importance to have it patented, had abandoned their use. He reported that he hoped much from cultivation at the proper time.

Mr. James Goodrich said he had very little trouble with the codling moth of late. His remedy was hogs. He kept seven or eight in his apple orchard. Last year he had rye in his orchard and kept the hogs out; result the poorest crop he ever had. He did not allow his hogs to root unless he wished them to do so. Kept his hogs in the orchard as long as they did not pick the apples from the trees. Hogs very soon learn where the apples come from, and would pick them from the trees as far as they could reach.

J. P. Wade corroborated the views of Mr. Loomis as far as they went,—but thought still more could be done. He had followed the recommendations of the late Dr. Goodrich in putting pans of sour milk in his trees, and this he considered the very best thing that had ever been tried. The cultivation of the orchard was a double benefit, in destroying the worms, if there were any in the ground, and in stirring up the soil and destroying all foul growth; we must do everything that is of any benefit. Perhaps no one thing would be effectual, but if anything bade fair to help, try it.

Mr. Wade was followed by N. W. Lewis, Wm. Corwin, and President Taylor, all favoring the use of hogs in the orchard; and not only this, but bands, sour milk, and everything else, but above all use every effort to get a unity of action among fruit growers.

We are too apt to wait until the right time comes before we set to work to destroy them. If we are to contend with them successfully, we must work at any time; now is a good time. If you search you will find them, not only in the places indicated, but in the crotches of limbs and various other places. Vigilance and perseverance will surely bring their reward in this as well as other pursuits of life.

N. W. Lewis said we could find the chrysalids wherever they could keep dry and warm; a great many were carried into the cellars in wormy apples, and Prof. Cook recommended putting wire screens over the cellar windows as warm weather approaches to prevent their escape. R. Doud said S. R. Lewis left a boat right side up in his orchard, which partly filled with rain water; into this he poured some kerosene oil, which served as a good trap, catching thousands of codling moths. As Mr. Lewis knows a codling moth when he sees it, this may be considered one more way for destroying them. Mr. Loomis said that Mr. Greenman of Lockport, N. Y., who is the patentee of the band invention, wrote him that last year he had 3,000 barrels of apples that were worthless on account of the worms. Now, if the bands are not effectual there, he did not see how they could be here; and if they did no good what was the use of bothering with them; the suggestion about hogs was good, and if there was no other way to cultivate his orchard, he would use hogs to. But as he had such an extreme dislike to hogs, so long as he could accomplish the same purpose by cultivation, he preferred that method.

But as we are getting the experience of successful fruit growers, let us see what has been the result of Mr. McCormick's on the town line road. He has tried hog cultivation thoroughly and says it does no good, and that he would much prefer sheep. It was quite possible that if he should be allowed to visit this world after he had passed away he might do different, but with his present

feelings and experience he would have but little to do with the hog. He did not give much credit to the notion of the worms hiding in rubbish, etc., for he had as much of that article around his premises as anybody, and as much of it in his orchard, and there was no more damage near it than there was remote from it; nor had he in fact, much faith in the apple business anyhow. Apples were grown everywhere almost, and to such an extent that there was no longer any profit in the business. He would not take ten acres of good land covered with an apple orchard as a gift, and were it not for the wind-break it afforded he would cut down much that he already possessed. Mr. A. Hamilton inquired of Mr. Loomis how many apples his orchard annually produced, the amount of land occupied, and the net proceeds. Mr. Loomis said he had about three hundred barrels per year, sometimes much more; he thought he ought to have a thousand every year; he had ten acres in apple orchard, and thought his apples had not averaged to net him over one dollar per barrel.

Mr. Bandle said he was just comparing the profit of raising apples at Mr. Loomis' figures, and wheat at the usual market price, and found it better than a yield of thirty bushels to the acre, which no country in the world averaged to produce; in fact, it was far better, for the cost of producing the wheat was several times greater than producing the apples, and yet we were the envy of the world for the *faculty* with which we could produce this great staple of the world, although our best average net profit per acre was not one-third as much as the apple orchard of Mr. Loomis; for his part he should not despair of the apple business so long as he could do so well at it as Mr. Loomis. Illinois produced good apples and was noted as a hog raising State. There he had his orchard entirely spoiled by turning hogs into it. He would like to hear if any one had tried the use of lime for the pest, and if so, the method of using it. Mr. Corner said a Mr. Hanford, at the State pomological meeting at Paw Paw, recommended the use of slacked lime thrown through the tops of the trees.

Mr. Doud had tried both hogs and sheep in his orchard, and both did much more harm than good. Mr. James Goodrich said no remedy would be of any use unless it was thoroughly tried. It was true that Mr. McCormick had tried hogs in his orchard and they had done but little good, and he ought to have known that it would have been so; he never had over four or five, where he ought to at least have had forty. Somebody asked about the expense of keeping so many. Mr. G. said they would nearly pick their own living in so large an orchard.

J. P. Wade said the moths worked most in Baldwins and Greenings, but with him the Jonathan was nearly exempt. President Taylor said with him those facing the lake and nearest to it were the freest. Mr. Hill believed in destroying the animal that laid the eggs, for if there were no eggs laid there would be no moths. To do this, set a tub or other vessel in the orchard, partially fill it with water, and at night set a light in it, and all the moths would rush to the light, fall into the water and be drowned. Mr. Lewis said that codling moths were not attracted by light; those attracted were not the codling moth, but many of them were of great benefit.

May Meeting.

The regular order of business was the discussion of the insect enemies of the fruits raised in this vicinity. An essay was read by Mr. A. Adams of Ganges.

J. P. Wade said the rose bug had been greatly troublesome with them. He had picked sixty-three from one peach not as large as his thumb. Knew of no way to destroy them.

Mr. Loomis said the rose bug had not hurt his peaches, but had nearly destroyed his grapes. Was plowing his grapes, hoping by cultivation to destroy the worms which become the rose bugs. They were very difficult to catch, as they were very active; would last about five or six weeks.

J. P. Wade did not think there was any use in fighting the rose bug. He had six hundred hills of grapes, and where the Clintons are next the Concords the Concords were uninjured, while the Clintons were entirely destroyed. He had tried to tempt them by cutting peaches and placing them within reach of the bugs, but they would not touch them. If they commenced on a peach they would eat it all; were not nibbling the whole crop like some insects, but made a finish of whatever they commenced. He said kerosene would kill caterpillars in apple trees. Take a sewing machine oiler, or some similar article, fill with kerosene, insert the point of the nozzle into the nest and inject a small quantity in different directions through the nest, and it was sure destruction.

The July meeting was devoted to the subject of transportation. Towards the close of the meeting Mr. Hamilton inquired if any one could give him the points of the Early Rivers from personal experience.

Mr. Graham said he found it an excellent peach, slightly cling, white, with pink cheek.

Mr. Purdy said there were two distinct varieties sold as Amsdens. Mr. Peek, his neighbor had both varieties, alike in all respects except size, one being as large again as the other, and sold at nearly double price in Chicago.

Mr. W. W. Lewis inquired if any one had found a desirable peach ripening at about the same time as Early Hale, as the Hale was very much inclined to rot, and was not as large as it should be; any improvement upon it would be an acquisition.

Mr. Graham said the Early Rivers filled the bill. It ripened at the same time, was a better, handsomer, and larger peach.

Mr. Hamilton inquired what progress the yellows had made. Mr. Purdy (yellows commissioner for Saugatuck) had spent one day in visiting orchards, and found where they were neglected last year a frightful increase was the result, but where they were thoroughly exterminated last year, but little was seen this. Low and heavy ground was much worse afflicted than light soils. Mr. Taylor (another Saugatuck commissioner) reported about the same state of the disease so far as he had examined. Capt. Reid's orchard, where so many were cut out last year, had but one case this year. In his own orchard where he cut out forty trees last year, he had not seen a sign this year.

Annual Meeting.

The society met at Masonic Hall, Douglas, on Saturday, November 27, 1880. The attendance was small, showing how soon the interest relaxes when a long interval occurs between the meetings. The few who were present, however, seemed to have retained their faith in the efficiency and usefulness of the society.

The meeting was called to order by the President, Rev. J. F. Taylor, who said that in the absence of any subject for discussion, while waiting for the members of some of the committees to arrive, he would like to have any one present suggest some subject for discussion. Mr. J. H. Bandle said it was perhaps too early to introduce the subject, for it was a fact that we were just now more affected by the subject of transportation than anything else. It might

not be wise to commence the work now, but it was certain that we could not afford to delay the subject till the last moment, as had been done the last season. If we would secure more certain, and prompt means of transportation, we must begin before, and a long time before the peach season began. We were, and have been always paying large freights. A proper attention to this matter in season would no doubt result in securing a reduction in this respect; but of as much importance as this seemed to be, it sunk into utter insignificance, as compared with the necessity of getting the fruit to market at the proper time. It had occurred so often during the past summer, that the boats had failed to take the fruit, or had failed to get it on the market in Chicago in season for the early trains, that where a small profit might have been left, this failure had thrown so much fruit into Chicago late in the day that a loss was inevitable; and it had been so great that nothing was left to the fruit grower, and he believed this was entirely unnecessary even with the means which we had. There were three boats belonging to the place, which, if rightly managed, would have been ample to have carried all the fruit, but the owners were so avaricious that unless sure of a *full* load of fruit, would partly load with lumber, and often this would sink the vessels so low that they would get hung on the bar and lie there, sometimes for days, until the fruit was spoiled; but this was a matter of indifference to the boat owners so long as their freight was secured.

Mr. Cumming said this was not only a fact during the peach season, but the indifference of the boat owners was continued down to the close of navigation. The fruit growers of the vicinity had brought several hundred barrels of apples to the warehouses to be shipped to Chicago, and supposed of course they had gone, and were wondering why they got no returns. The steamboats had made several trips since but had failed to take the apples, and now they were all frozen in the warehouses, an entire loss to the owners, not only of the apples but of their labor in preparing them for market. Many others spoke on the subject and in about the same way, all agreeing that the boat owners had been shamefully negligent of the interests of producers.

Mr. P. Purdy said that for the coming season there would be ample facilities for sending fruit by boat to Richmond from Saugatuck and Douglas, and thence by rail to Chicago. The freight would be the same as by boat, except the dockage of one-half cent in Saugatuck and Douglas would have to be paid extra. The railroad Company had promised to build a side track to the river, and put fruit cars on the night express which would leave Richmond at 11 P. M., and reach Chicago at 6 o'clock next morning. The trouble with the boats was they were too slow, seldom reaching Chicago till 9 or 10 A. M.

Mr. Woodhull said he could not speak for the other boats, but the Seaverns had reached Chicago in good season, the trouble being that often the dock would be so filled up that it would be some time before they could unload. The question was asked if there was but one dock in Chicago. It was thought strange that shippers should suffer so much when there was so much room. In answer to the suggestion that delay would be caused by going through so many bridges, a sailor said ten minutes was the longest time boats were ever delayed on account of passing a bridge, so this was not much of an excuse.

Mr. Taylor said it was characteristic of the boats to be late—after early trains had gone.

Mr. Corner was discouraged; if this thing was to be kept up, the quicker we got out of the peach business the better.

N. W. Lewis thought we had better continue a committee on transportation. Mr. Taylor said we needed transportation facilities across the lake as much as up the river and on the cars; the distance was less and fruit could be carried in better order. It would be well to see vessel men—ours and others—and find out just what they were going to do.

N. W. Lewis said he had often been asked if he had not lost faith in the fruit business, and had always said no. His reason for this was that six years ago there was more fruit raised in Western Michigan than now. At that time there were 600,000 peach trees in bearing in Berrien county alone. He doubted if there were 200,000 bearing in the whole of western Allegan county. At that time our market was not two-thirds as large as now. There was a time when six or seven steamboats were employed in the peach trade from St. Joe alone, making daily trips, and sometimes as many as 60,000 baskets—much larger baskets than those now in use—were shipped in a day by them. He did not believe as many had been shipped in any one day this year from Western Michigan. He did not believe it was the great quantity of peaches which had made prices low but the very imperfect system of transportation.

REMARKS OF THE SECRETARY.

The past year has been one of the most fruitful for the fruit-grower within the memory of this people. The insect enemies have been less destructive, and the yellows has been very much less severe than last year. The times were so good and labor so well rewarded throughout the west, that we all looked for a rich harvest, abundance of fruit and remunerative prices. In the amount of fruit we were not disappointed. The quality was excellent and the size fully up to the average. As the small fruits brought very fair prices, we were encouraged; the first shipment of peaches paid fairly well, but was at least two weeks earlier than usual. After this everything went wild, transportation was uncertain on the lake, and the railroads had so much to do that frequently the cars were not unloaded till afternoon. This precluded sending them beyond Chicago, as all early trains were gone. Added to this, the peaches ripened too fast, so that some days the market was glutted, and others only small shipments were made. The prices obtained were hardly sufficient to meet expenses. Still we are not discouraged; there is no business which is continuously prosperous, and as this is our first even partial failure to receive profitable returns, we propose to redouble our efforts to produce such choice fruit as will command remunerative prices.

INGHAM COUNTY HORTICULTURAL SOCIETY.

PREPARED BY EZRA JONES, SECRETARY.

The officers of this society for the year 1881 are as follows:

President—Prof. W. J. Beal, Lansing.

Vice President—W. H. Overholt, Mason.

Secretary—C. B. Stebbins, Lansing.

Treasurer—Mrs. Daniel L. Case, Lansing.

March Meeting—Organization.

The call to organize a county horticultural society, notwithstanding the inclement weather on Saturday afternoon, brought together a goodly number of ladies and gentlemen. They met at the rooms of the State pioneer society and were called to order at 2 o'clock by Prof. W. J. Beal, who stated briefly the reason for issuing the call, and nominated for temporary chairman Wm. Van Buren, who was also made permanent chairman.

Secretary Charles W. Garfield occupied a few moments discussing the matter of

HOME BUILDING,

and the importance of organized effort in creating an interest in developing more attractive and beautiful homes indoors and about the house. He illustrated the growth of civilization and culture as connected with the increased attention given to homes and their attributes, by examples from savage nomadic habits as contrasted with the unity and love brought out in the development of our best homes. Michigan, he maintained, was a State standing at the very head in its advantages for home building on account of being out of debt, its climatic peculiarities, its cultivated people, variety of fruits and trees, and products of the soil. He gave a short history of the Michigan pomological society, and a statement of its present methods of work, closing with an appeal for the organization here of a branch society which should make its proceeding a part of the annual pomological report, and thus render the volumes of greater value to the people of Ingham county.

Ezra Jones read a short and interesting paper on

STRAWBERRY GROWING,*

advocating good care, rich soil, and love for the work, as indispensable to success in growing the best varieties. He named Seth Boyden and Duncan as berries of very high quality. The best fertilizers he had found to be wood ashes and a mixture of hen manure and good earth. He made two applications, one at the time of blossoming, and one immediately after fruiting. In preparation of soil he urged thorough drainage and subsoiling, but would not bring the subsoil to the surface. The best varieties, to succeed well, must be grown in hills and the runners kept off. By this method the stools would spread out and large crops could be harvested.

* This paper appears in full in the Secretary's Portfolio.

Mr. Overholt of Mason was called upon for a paper on small fruits but asked for an excuse because of lack of time in preparation.

PARKS AND LAWNS.

Mrs. A. Allen gave an essay on the keeping of parks and lawns, rehearsing the important reasons for maintaining beautiful parks in cities and villages for the pleasure and education of people who were not able to have broad lawns and beautiful gardens of their own. In some detail she gave the most approved methods of preserving lawns in their greatest beauty, by thorough preparation of soil to begin with, and the addition of abundant fertilizers thereafter. Wm. Appleton read a paper on

HOME ADORNMENT,

speaking particularly of the beautiful things in the way of plants, flowers, trees, green turf, and well-made walks and drives that may be brought around the home at trifling expense, the work of the members of the family. He believed in all the members of a household working together to make home beautiful, arguing that a moral influence went with the work that made better people.

Mrs. M. W. Howard followed with an essay upon the

INFLUENCE OF AGRICULTURAL PURSUITS,

filled with bits of experience and observation from her own life. She spoke of a letter written by Jonathan Shearer, of Plymouth, who told of planting a young orchard to replace an older one, even although he was past three score years of age. She spoke of the products of horticulture as adding to comfort and health, and as particularly suited to cheer the sick.

Secretary Garfield being called out again explained the method usually pursued in organizing branch societies, after which, on motion of Prof. Beal, the names of those present who were in favor of organizing as suggested were taken, numbering about 30.

ELECTION OF OFFICERS.

The meeting proceeded to the election of officers, which resulted as follows: President, Prof. W. J. Beal, Agricultural College; Vice President, Mrs. D. L. Case, Lansing; Secretary, Ezra Jones, Lansing; Treasurer, W. H. Overholt, Mason.

These officers, by provision of the by-laws, constitute the executive board.

On motion of Ezra Jones, the constitution presented by the State society was adopted, and the society organized as the Ingham County Horticultural Society.

A vote of thanks was tendered Mr. Garfield for his attendance and assistance, when, upon motion, the meeting adjourned to April 10 at 2 o'clock in the same place.

At a meeting of the executive board the following topics for discussion, and persons to lead in them, were selected for the April meeting:

Selection, time of planting, and care of ornamental trees, Prof. W. J. Beal.

Fruit trees, time to plant, and best selection of varieties, Geo. W. Parks.

List of suitable varieties of small fruits for culture in city gardens, W. H. Overholt.

Ornamental shrubs, Mrs D. L. Case.

April Meeting.

President Beal opened and read a paper on

ORNAMENTAL TREES AND SHRUBS.

We should select a variety of trees, having in mind the shape of the top, shape of leaves, color of foliage in summer and autumn, the color of the twigs and bark on the trunk, the growth of the limbs, whether stout, slender, erect, horizontal or drooping. We bear in mind whether the tree grows fast or slow, whether it is to remain a small tree or to become a large one. We bear in mind whether the tree is to stand by itself or to form part of a group. We select a tree with reference to those with which it is to be planted. In all this there is abundant need of care, judgment, independence, experience, and good taste.

At the Agricultural College we have something like 300 kinds of trees and shrubs, some of which have been growing for many years. Two severe cold winters have weeded out those which are not iron-clads. We have tried many kinds which have proved too tender for our cold winters.

I should not advise every one to make the same selections of trees. Tastes differ—we like a variety. By looking our city and country over we can see fine specimens of American elms, rock elms, sugar maples, silver-leaved maples, bass-woods, white-woods, beeches, white oaks, catalpas, English elms, horse chestnuts, Norway spruces, arbor vitæ, balsam firs, hemlock spruces, and many others.

In 1878 the editor of the Rural New Yorker sent letters to a large number of men in various parts of the northern States, asking each to give "a list of 25 trees and 25 shrubs that should be perfectly hardy in climates like that of New York." This list should not include any evergreens. A large number of responses were received, and a summary made out.

The tree on the greatest number of lists ranked as number one; the next ranked as number two, and so on through the list. I gave a list for Lansing, as I was not familiar with the climate of New York. On account of the severity of our climate, some trees which would otherwise be desirable had to be discarded in Michigan. Seventeen trees of my list of twenty-five appeared in the list of twenty-five for New York. Using only the common English names the list stands as follows: American elm, cut-leaved weeping birch, yellow wood, Soulange's magnolia, sugar maple, European larch, tulip tree, weeping beech, imperial cut-leaved alder, horse chestnut, Norway maple, cucumber tree, maiden-hair tree, Wier's cut-leaved silver maple, American basswood, Kentucky coffee tree, and oak-leaved mountain ash. Of these seventeen I have only seen six about the city of Lansing.

Of evergreens for this neighborhood, I will name: Norway spruce, white spruce, hemlock spruce, eastern spruce, white or Weymouth pine, Austrian pine, red or Norway pine, Scotch pine, Swiss stone or Cembrian pine, red cedar and American arbor vitæ.

Of evergreen shrubs I will name: Dwarf or mountain pine, Irish Juniper, savin, Siberian arbor vitæ, globe arbor vitæ, and heath-like arbor vitæ.

For a small place, I will give a select list of 18 as an example, taken from the former list: 1, cut-leaved weeping birch; 2, yellow wood; 3, imperial cut-leaved alder; 4, Soulange's magnolia; 5, European larch; 6, weeping beech; 7, cucumber tree; 8, maiden-hair tree; 9, Wier's cut-leaved maple; 10, Norway maple; 11, hemlock spruce; 12, oriental spruce; 13, Cembrian

pine; 14, dwarf pine; 15, Irish juniper; 16, Siberian arbor vitæ; 17, globe arbor vitæ; 18, heath-like arbor vitæ.

For street trees, I will name American elm, Norway maple, English elm, basswood, black ash (in rich soil), horse-chestnut (on clay ground), sugar maple (the last the least desirable).

The best time to set deciduous-leaved trees is in spring before the buds start. Set them on a still, cloudy day, if not too inconvenient. The best time to set evergreens is just as the buds have begun to push out and show the new leaves. Trees are in the best condition to grow which have been grown in a nursery where they have been several times transplanted. This trims the roots and causes new roots to come out thickly near the stem. The roots, while out of the ground, should be covered with a blanket or damp straw to protect them from sun and wind. For success, the soil about newly set trees should be well cultivated for three or five years for a distance of at least four feet each way from the trees. The culture should be kept up till the trees become well established. A heavy mulch, extending four feet from the tree, is a partial substitute for cultivation.

The man who gets tall, slender trees from the forests, with few roots attached, and carries them some distance with the roots exposed to the broiling sun and sharp wind and sets them in little holes in the sod, will surely be disappointed if he expects to get pay for his labor. Perhaps I can do no better than to close this paper with a list of trees which are tender or otherwise undesirable. Locust, honey locust, silver-leaved poplar, Lombardy poplar, cottonwood, ailanthus, red bud or Judas tree, most magnolias, mountain ash, weeping willow, weeping ash, balsam fir (except when young), most evergreens from the Pacific coast, English oak, golden arbor vitæ, Chinese arbor vitæ.

He was followed by George W. Parks in a clear and practical paper on "fruit trees, how to plant and time to plant." In selecting varieties he referred to the list published in the Michigan state pomological report for 1879, which had been prepared with great care. He advised thorough drainage of the soil, and only rich earth should be worked in around the roots. Apple trees should be planted in rows 30 feet apart each way, cherries and standard pears 20 feet, dwarf pears 12 feet, plums 15 feet, peaches 18 feet, and quinces 8 feet. The proper time to plant is when the buds are dormant. Spring seems to be the most natural time, and in this locality they should not be planted later than the middle of May. November was also mentioned as a good time to plant, but care should be taken not to let the roots of the trees freeze while out of the ground.

L. B. Baker inquired if it would not be admissible to grow a row of grapes between rows of apple trees set 30 feet apart.

Mr. Parks replied that some other fruits, such as strawberries and raspberries, would be more suitable.

J. Ashworth said Mr. Yeomans, an extensive fruit-grower near Rochester, N. Y., interlined his rows of apple trees with peach trees.

Dr. O. Marshall wanted a list of fruit trees especially adapted to this locality.

Prof. Beal thought that, in time, by the reports of members of this society, at future meetings, a better list for Ingham county could be furnished than that for Central Michigan in the State pomological report. That list was more appropriate for the region of Kalamazoo.

Mr. Rowe, of Mason, asked for a list of best dwarf pears for this county.

Mr. Parks named Duchesse de Angoulême, Louise Bonne de Jersey, Buffum, Belle Lucrative, and for winter, Vicar of Winkfield.

Mr. Baker desired to know if, in growing a ten-acre pear orchard, where time was no object, it would be advisable to plant any dwarfs.

L. B. Potter thought that dwarfs might be profitably grown between standards.

Some one inquired for a remedy for blight in pear trees.

Mrs. D. L. Case said she had tried iron filings with some success, but had found salt better.

Prof. Beal thought salt a good remedy.

W. H. Overholt read a well-considered paper on "small fruits for the garden." Strawberries should be grown in hills, and the plants set 12 by 24 inches apart. In order to cover the entire strawberry season, three varieties were desirable, and 100 of each of them would furnish sufficient fruit for a family of moderate size. He recommended for early berries the Duchesse or Duncan; for medium, Wilson or Monarch of the West; and for late, Seth Boyden or Capt. Jack.

Of black-cap raspberries he said "the Doolittle is valuable for its earliness and hardiness," and the Seneca for its superior flavor, size, and productiveness. Of the reds he said the "Brandywine and Herstine would probably give good satisfaction." He advised frequent and deep stirring of the soil among the plants.

Inquiry was made as to the size and value of the Gregg.

Mr. Jones stated that they were the largest of the black-caps, and were firm enough for transportation to the most distant markets.

Mrs. D. L. Case read an exceedingly interesting paper on ornamental shrubs.*

The society resolved to meet for the present on the second Saturday of every month at 2 o'clock P. M., and that the sessions be limited to 2½ hours. It was resolved to have a strawberry show sometime in the month of June.

L. B. Baker was appointed a committee to see the superintendent of State buildings in regard to the future use by this society of the pioneer room.

May Meeting.

Geo. W. Brown read a paper on

VARIETIES, KEEPING QUALITIES AND CULTURE OF GRAPES.

It is quite essential that good soil should be selected and well cultivated for grapes to thrive well. It is as necessary to till a vineyard as it is a field of corn. Without proper culture you cannot expect a good yield of fruit,—the richer the soil the finer the flavor of the fruit will be. There must be pruning and cutting back of the old wood to give the new fruit-bearing wood strength and nourishment. This must be done before the sap rises in the vine. Summer pruning has proved with me a success. The large growth of vine takes the nourishment that the fruit should have, and by pinching off the young growth to within four buds from the fruit the grapes will be larger and better quality. The leaves must not be plucked from the vine, for the sun will burn them and they will not ripen nor retain flavor.

The varieties of grapes which I am cultivating in my vineyard, consisting of 250 vines, are among the best varieties of the eastern nurseries, the largest number being Rogers' hybrids of different numbers, Hartford, Concord, Delaware, Eumelan, Creveling, Autochon, Martha, Senasqua, Union Village, Walter, Perkins, Worden's Seedling, Diana, and some other varieties. Hartford

* In Secretary's Portfolio.

ripens first, is a very good grape, but drops its fruit from stem; vine hardy and productive. Worden's Seedling ripens about the same time, is richer and better, and holds its fruit. Massasoit (Rogers' 3), early, sweet, and a good bearer; is a very good keeper. Wilder (Rogers' 4), comes next, Merrimac (No. 19), about the same; they are both excellent bearers, large clusters, both dark. Wilder holds its fruit,—thick skin, sweet, very large berries, will keep until spring. No. 19 drops its fruit,—it is sweet and juicy, thin skin, clusters often weighing one pound, will not keep long. Lindley (No. 9), a red grape, not large, very sweet and high-flavored, good keeper. Goethe (No. 7), a white or nearly so, a little too late for this climate. Agawam (Rogers' 15), a very productive grape, juicy, sweet, aromatic flavor, a splendid keeper. Salem, the best of the Rogers, is the richest flavor, always heavily fruited; is the best keeper, or as good as Wilder. Martha, a small white grape, very sweet and early, will not keep. Perkins, flesh-colored, sweet, musky, drops its fruit. Concord is well known,—I need say nothing about it, only in my estimation it is third-class. Senasqua, a large, black grape, surpasses the Wilder in flavor, a vigorous grower, large clusters, large berries, sweet and juicy, a good keeper. Walter is the sweetest I have in my collection, a red grape, not large, fine flavor, skin thin, subject to blight. Delaware, a good bearer, small fruit, and good keeper. Diana, a red grape, larger than Delaware; compact bunches, sweet, a peculiar flavor, a good keeper. This with several other varieties I had some time in March, this spring, in my cellar. My mode of keeping is spreading for a couple of weeks on shelves only perfect ripe clusters, not breaking a berry, and lay them in boxes. I use pasteboard boxes, rolling each cluster in paper, or putting in layers with paper between, and closing the boxes. If a grape molds and comes in contact with others they will do the same, and by rolling separate clusters they retain their flavor better and keep better.

This is my experience in grape-raising. Any new suggestions from the society will be very gratefully received, for I consider it the duty of all fruit-growers to cultivate only the best varieties, that our State may become an equal with western New York.

F. B. Johnson said, unless he had been erroneously instructed, the richest soil is not desirable for grapes. It would cause the vines to make so rank a growth that they would be more liable to winter kill.

Mr. White said his grapes were on a very rich soil, and had never been injured by the winter.

Mr. Curtis claimed that the Concord was the grape for this region, and was not affected by the coldest winters.

F. B. Johnson gave an extempore talk on "Marketing Small Fruits." He showed that the dealer who sold by liquid measure violated the law and incurred a severe penalty. He said there were about $4\frac{1}{2}$ quarts difference in a bushel between liquid and dry measure. He thought the law ought to be enforced.

A paper was read by A. L. Bours on "The Kitchen Garden." He was followed by F. A. Gulley on "Onions for Profit." He spoke from brief notes, and at the close, was unanimously requested to write out the substance of his remarks, for publication.

June Meeting.

The Society met at the court-house in the city of Mason. The programme for the meeting was as follows:

"Pruning and Training Grape Vines," by Dr. A. D. Brown.

"Shall we Encourage the Further Planting of Apple Orchards in Ingham County?" by W. Asa Rowe.

"Utility Plus Beauty," by C. B. Stebbins.

The question of Mr. Rowe's paper was discussed at considerable length—he and Mr. Jones taking the affirmative, A. F. Wood and some others the negative.

Mr. Rowe asked President Beal what varieties of winter apples he would recommend for planting in this county.

The president named Northern Spy, Red Canada (top-grafted) and American Golden Russet.

Meeting for the Exhibition of Small Fruits, June 19.

The committee, composed of Messrs. E. Bidelman, C. B. Stebbins, and L. B. Baker, were requested to classify the fruit on exhibition, and graded it as follows, the highest first, and following in the order of merit:

Monarch of the West, Cumberland Triumph, Colonel Cheney, President Lincoln and Sharpless, Chas. Downing, Windsor Chief, Captain Jack, Wilson, Kentucky, and Green Prolific.

The Windsor Chief was the most regular in shape, and the most beautiful berry on exhibition. Sharpless was the largest. Several berries of this variety measured six inches in circumference, and many measured five inches. It is very irregular in shape and rough in appearance, but solid all the way through.

At this meeting Prof. A. J. Cook read the following paper on

A NEW INSECT ENEMY.

Paria aterrima Oliv.—Strawberry leaf beetle. Order *Coleoptera*. Family *Chrysomelidae*.

As will be seen, the little beetle whose life history I am about to recount is a near relative of the Colorado potato beetle, and also of the grape vine and cabbage flea beetles, as it belongs to the same order and family. The insects of this family—*Chrysomelidae*—so named from the golden, metallic lustre which often characterizes them, are all phytophagous, or plant-eaters. They are often called leaf-beetles, from the fact that they all prey upon the foliage of plants. This habit usually characterizes the grubs or larvæ no less than the beetles or imagos.

In this family the tarsi or feet are four jointed, the bodies are oval, though in some cases they are somewhat elongated, so as to resemble the beetles of the borer family—*Cerambycidae*,—but their shorter antennæ and leaf-eating habits quickly distinguish them from the borers.

The little beetle in question belongs to the sub-family *Chrysomelides*, in which the antennæ are wide apart, the body oval, body wholly covered by the elytra or wing-covers, while the larvæ live exposed on the leaves. This description will at once call to your minds the ubiquitous pest, the Colorado potato beetle. But our subject belongs to a distinct tribe, the *Eumolpini*; in which the prothorax is very convex, narrower than the abdomen, its margin indistinct, the antennæ are slender, nearly filiform, and about half as long as the body, the interior coxæ is globose, the 3d joint of the tarsi deeply bilobed, and the claws are bifid.

In the genus *Paria* the elytra or wing-covers are punctured in rows, the claws

bifid, size small, color usually brown with dark spots, though occasionally black, and there are lobes in front of the prothorax, between the eyes. The species in question, which I have been informed is *Paria aterrima* by one of the best Coleopterists of the United States, has not these lobes, and seems to me to come under the genus *Metachroma*.

This species is without a doubt two-brooded. In March they were seen by Mr. Ezra Jones, through whose kindness I have been supplied with specimens. In April and May they were very numerous. The last of May the beetles disappeared. Now, June 19, they are for the most part in the pupa state, in earthen cocoons about an inch and a half beneath the surface of the ground. I find many full-grown grubs or larvæ and a few smaller larvæ, which were found to be feeding on the tender rootlets. Certainly in July another generation of beetles come forth. Whether there are more than two broods or not I am unable to state, but shall be able to determine during the season. I presume they pass the winter as imagos, from their early appearance as beetles in the spring. They may exist in winter as pupæ, and very likely some do, which would account for their scattering along as they do through the season.

The larva is white, with a yellowish head and brown jaws. There are eleven segments back of the head. The breathing mouths show plainly along the side of the body. There is only one pair wanting, those on the first thoracic ring. The pair on the second ring are very large. There are rows of hairs extending transversely one to each ring, but few hairs to each row on the side of each ring. About each of the stomata there seems to arise a tuft of hairs. The usual three pairs of thoracic jointed legs are plainly visible. The length is $5\frac{1}{2}$ mm. (.22 in.)

In a small spherical cocoon of earth we find the pupa. It is also white, shorter than the larvæ, only 4 mm. in length, hairy, with the legs, antennæ, wings, etc., bent down close to the body, as is the case with all Coleopterous pupæ. The facets of the compound eyes show quite distinctly. In the cocoon will always be found the head-shield and jaws of the larvæ. The pupa is constantly moving its abdominal segments when disturbed.

The little beetle is only 3 mm. ($\frac{1}{8}$ in.) long. The head antennæ, legs, and wing-cases are yellowish, the throat brown, and the under side of the body black. The center of the thorax is clouded with black, and generally each wing-cover is yellowish, dotted with two black spots. The posterior spot is much the larger. In about one beetle in six I find them all black. In a few cases the black beetles were tinged with yellow at the tip of the body. These polymorphic species are not very rare among insects.

HABITS.

These beetles, like all of their family, are voracious feeders, and, though small, are so numerous that in early spring and after harvest they completely defoliate the strawberry plants. They have done this at Mr. Ezra Jones' and, as I understand from him, in the strawberry plantation of Mr. Gardner of Dimondale, from whom Mr. Jones procured some plants and from whose place he thinks he brought the pest.

The larvæ appear to eat the young, tender roots, and in this to differ from others of the leaf eating beetles. As these larvæ, as well as the pupæ, are in the earth about the roots of the plants, we see that their importation with affected plants would be very easy, and could only be avoided with certainty by having the roots of the plants thoroughly washed before setting.

REMEDY.

I feel certain that either Paris green or London purple would certainly destroy the beetles if applied to the plants as we apply them to destroy the potato beetle or canker-worm. In the use of Paris green, caution is necessary that the article may be genuine. When I hear that the potato beetle and rose chafer grow fat on this poison, I feel sure that the poison is not there, but that some spurious compound is colored and sold for Paris green.

July Meeting.

Only a few present. No papers were read.

President Beal presented a variety of specimens from fruit and forest trees, of blighted leaves. "The cause of this blight is not yet established with any certainty; but he thinks it probable, that in consequence of the rapid growth occasioned by the abundant rain, the leaves and limbs are not sufficiently hardened to resist the hot sun."

August Meeting.

At the monthly meeting of the Ingham county horticultural society, held at the pioneer room in the new capitol, on Saturday afternoon, August 14, Mrs. C. Goodnoe read an essay on "Flowers and their Mission," and Wm. Gladden one on "Our Rural Highways." Mr. G. advocated a resurvey, by State authority, of the older portions of the State, where many of the "witness trees" had wholly disappeared, and the exact boundaries of the highways had become uncertain, for the purpose of establishing permanently those boundaries and thus determining, beyond a doubt where the road-bed ought to be. He said as things were now, in many places there was a change of the road-bed with every change of highway officers, and the roads were kept thereby in poor condition. Many farmers desired to avail themselves of that provision of the highway laws which permitted them to set out shade and ornamental trees eight feet from the outside lines of the highways, but they could not do it with any feeling of certainty that they would be allowed to remain, as long as there was so much doubt as to where the boundaries really were. Mr. Stebbins inquired if a resurvey would not be likely to require many changes in the location of fences, and in some instances even of buildings, and so create great embarrassment and much ill feeling. He said that such would have been the result of a resurvey of a certain avenue in the city of Lansing, if that survey had been insisted upon.

Mr. Gladden said it might not be wise to insist upon it in the cities, but the sooner it was done in the rural districts the sooner the roads would be made good, and their borders shaded and ornamented.

Prof. Beal said the highways were certainly bad enough, especially the one that led east from the city to the College, and that something ought to be done to make them better.

The President called attention to some very beautiful bouquets of flowers that had been sent in by Mrs. W. S. George and Mrs. Robert Mann; also, to a large variety of rare foliage plants from the floral gardens of R. Mann & Son. Mrs. George also sent in several varieties of apples, both summer and winter, the names of which she desired to know. Mrs. D. L. Case presented one variety of apple for a name. Prof. Beal said it was a Primate, one of the very best summer apples for home use. It was of superior quality, did not ripen its fruit all at once, but continued for several weeks.

Messrs. Gladden and Case confirmed the statement of Prof. Beal.

C. B. Stebbins exhibited a cluster of half-ripened Israella grapes, and Johnson & Brown three clusters of Talman (or Early Champion) almost ripe. Mr. Stebbins gave a very interesting account of a recent trip to Vermont and New Hampshire. He stated that he saw no fruit on the tables of the hotels in those States except wild red raspberries and huckleberries. Their only cultivated fruit was the apple.

Prof. Beal inquired of those present who cultivated grapes if they had set as well as usual this year. F. B. Johnson and Wm. Gladden replied that the clusters did not seem to fill out well. The professor stated that last year they fruited forty kinds at the college. This year the grapes were large but the clusters imperfect.

Mr. Sturgis asked Prof. Beal about the prevalence of the codling moth in the college orchard this year. He said he (Mr. S.) kept pigs in his orchard and knocked off all the fruit he could see that had been affected by the moth. It was not so great a task to do this as might be supposed by one who had not tried it. He knocked off ninety-seven apples from one tree in about four minutes. He felt sure he was getting rid of the moth in this way.

Prof. Beal said he did not doubt but that it was a good thing to let hogs run in an orchard, but the orchard at the college was not so situated that they could keep hogs in it. They used bands, and thought that the moth was not increasing, but about held its own. He said if the neighbors would use the bands they might get rid of the moth. The expense was small, only about two cents a tree.

Mrs. Case said chickens had kept them off their trees at one time, then they disposed of their chickens because they troubled their flowers and garden and the moth had come back. Now they were keeping chickens again.

Prof. Beal said he had known of one large orchard that had been kept free by a flock of turkeys.

A gentleman asked how to keep the curculio from his plums. Mr. Gladden said he had two plum trees by his hog-pen. He shook off the plums stung by the insect and threw them over to his pigs. He did not fail to get plums.

Mr. Sturgis said he placed a sheet under his trees, rapped the trees, and killed the insects that fell into the sheet.

F. B. Johnson and Robert Mann were appointed a committee to procure speakers for the next meeting.

September Meeting.

"Tree Agents" was a topic presented by Dr. O. Marshall in a few extempore remarks. He stated that soon after the publication of the fact that he had purchased land for horticultural purposes he was infested by tree agents, and he proposed to give some of his experience with them. There were some agents, representing responsible nurseries, who were generally honest, but would get as high prices as possible. There is another class who are not responsible. They have an illustrated book from some nursery, and go over the country taking orders. In his neighborhood last year they took orders for a quince, which they represented as growing on a tree the same as apples; grapes that would keep the year around; and they tried to sell to him a wild goose plum, which they represented as very superior, but which was simply a superior wild plum. Some of his neighbors purchased them, not knowing what they were. They also sold a so-called Japanese plum, which is really a

persimmon, and unfitted for this latitude ; also a Japanese peach, represented to keep all winter.

There is another class who are perfectly irresponsible. They send out catalogues from responsible nurseries, but they get their trees from nurseries having inferior stock on hand, which they purchase cheap. One of these nurseries is located at Saugerties, N. Y. He made an order with one agent amounting to \$160, paying \$20 in advance. This was in the fall, and hearing nothing of the agent or the trees, he wrote a little before he wanted the trees, but could get no answer until he baited the agent with a prospect that he had more money to spend. Upon inquiry, he found that this man had no nursery of his own, was poor, and perfectly irresponsible. He was induced to deal with him from seeing his correspondence in the *Detroit Commercial Advertiser*, in which he had some fine articles on the strawberry ; but he pocketed the loss of his \$20 rather than take any farther risks on him. Another man, whom he named, lived in New Jersey, and his standing was very doubtful.

It had seemed to him that protection might be obtained if a list of dealers and agents who had been proved to be reliable were kept by the society for reference. Even nurseries themselves were not always reliable. In one order from a nursery he got nearly 400 Lombard plums where he should have had but 86.

Prof. Beal referred to a letter he had received from Jackson, saying that agents were offering pear trees represented to be grafted on imported stocks, and blight-proof. Nurserymen often grafted on imported stocks, but they were generally sometime in the country before they were grafted or budded, and were no more blight-proof than any other. They were also offering "weevil-proof" plums, Russian apples, very superior, and strawberries which produced no runners. A horticultural society, similar to this, had been started in Jackson, and he had written to the gentlemen to support it. It was the best kind of insurance to its members against frauds, for dishonest agents and nurserymen rarely troubled members of these societies. At the Agricultural College they had been beaten by some of the best nurserymen. They had ordered some choice trees which were just coming into bearing, and they are not all proving to be what they were bought for. Sometimes these mistakes occurred through incompetent employés. If we could get some good men at home to raise these things, so far as the climate will permit, it will be better to patronize them. It was almost impossible, most of the time, to propagate pear and apple trees here. He would as soon have apple trees two years old, grown in Michigan, on good clay land, as any, because the last two seasons have been mild, but those grown in previous seasons he would not want, because the seasons were not favorable to a healthy growth.

Mr. Jones had a similar experience with strawberries. On his first orders but few were true to name.

The president thought it very easy to get mixed on small plants.

Mr. Baker had made up his mind that the best way was to buy his small fruits of such men as Mr. Jones. His large fruits he had purchased, as far as possible, from Mr. Parks.

Messrs. Stebbins and Johnson related similar experiences in spurious fruits.

PRESERVING GRAPES.

Mr. Baker asked for the best methods of preserving grapes fresh during the winter. He had tried the method previously explained by Mr. Brown, but without full success.

Various methods were described by the president and Messrs. Johnson, Jones, Stebbins, and Mrs. Case, and on request of the president members agreed to try them all, each selecting a particular method.

THE ENGLISH SPARROW.

Mr. Baker asked if it was desirable to permit the propagation of the English sparrow in the country.

Mr. Johnson said if they were going to chase away the other birds, as he understood they did, he would rather do away with them.

Prof. Beal said the students at the college wished to get some, and this led them to seek information. They concluded that in cities their presence made no particular difference, but in the country they were a nuisance. They eat a great deal of corn and drive away other birds. He should be sorry to see them introduced.

Dr. Marshall said he had heard that they picked out the fruit buds, and Mr. Baker made a similar report.

WINTER FRUIT.

The question, "Is early picking of apples, before fully matured, preferable to picking after frost?" A general discussion of this question led to the conclusion that early picking was the most profitable, placing the fruit in a cool, dry place until the weather became too cool to keep it out of the cellar.

FRUIT AND FLOWER EXHIBITS.

Mr. Johnson exhibited some fine specimens of the Concord, Delaware, Champion, Agawam, Lady grape, and other varieties. He spoke briefly of the Champion, and thought it superior to the Hartford. The Agawam and the Lady were good grapes. He would not recommend the Croton grape. They are a weak growing vine, and the fruit is not equal to the Lady or the Martha. The Lady ripens with the Delaware, and for eating there is nothing ahead of it. The Brighton is a very excellent grape. The berry is white. The Martha is green when ripe.

Mr. Jones raised the Lady, Delaware, and Brighton, and the best grape he knew of was the Brighton. Mr. Johnson said the Worden was next to the Brighton. It was hardy and prolific.

Mr. Stebbins presented fine specimens of the Isabella, Israella, Iona, Concord, Kalamazoo, Delaware, and other varieties. The best grape he knew of was the Iona.

Dr. Marshall presented a variety of pears for a name. The fruit is large, and grows in clusters. He purchased it for a dwarf Bartlett, but it was a standard tree.

Mr. Swift presented some pears and a grape for names.

Mr. Gladden also presented pears and said he had supposed them to be Flemish Beauties, but had found they were not. He also exhibited another pear, picked from a little dwarf tree, which for size, shape, and beauty of color excited the admiration of all, but they were unable to name it.

Mrs. Stebbins sent a beautiful bouquet, and Mr. Johnson presented a choice variety of flowers, heliotrope, tuberose, fuchsias, tea roses, etc.

October Meeting.

The October meeting was held at the Agricultural College in acceptance of an invitation from Prof. Beal, and the time very profitably spent in visiting objects of interest there under the guidance of the president of the society.

In all, the visit was very pleasant and profitable. The impression left upon the mind after the visit was that the Agricultural College was doing a grand work for the State of Michigan, and well deserves the support of the people of the State.

Before the society adjourned a vote of thanks was given to Prof. Beal for his kindness in showing the members over the grounds and pointing out the many things of interest.

November Meeting.

First paper was by Robert Mann on "Growing Celery."

L. B. Baker asked if a cellar ventilated by pipes under ground, would be a good place to keep celery. Mr. Mann thought it would.

F. B. Johnson said the first year he raised celery, he pitted some of it in sand in a cellar, for early use. He soon noticed that it was wilting, but upon being profusely sprinkled with water, it revived and made good bunches.

The president asked Mr. Mann the cost per bunch of raising celery. Mr. M. replied about 1½ cents for early; but that put up for winter cost much more; he could not say how much.

Mrs. Overholt not being present, her paper on "Canning Fruit" was read by the secretary.

Mr. Mann asked President Beal if he did not think tin cans preferable to glass for canning fruit. The president thought not if the glass were kept in the dark. Some tin was leaded and not safe to use.

The third paper was by Geo. W. Parks, on "Grafting Fruit Trees."

During the reading of his paper, Mr. P. showed how easy it was for a careless nurseryman to make mistakes, but said most of the errors in sending out stock resulted from the employment of unskilled help. Sometimes the nurseryman was pressed with orders; got in a hurry, and had to take such men as he could get.

Mr. Jones said while he knew of no occasion to find fault with Mr. Parks, he protested against nurserymen shielding themselves behind their own lack of care or the carelessness, or unskillfulness of their employés. They had no right to be careless, or have careless or unskilled help in such a business. The consequences are too serious. Let us see what the consequences are. The farmer or prospective fruit grower thoroughly prepares his ground for an orchard, looks over the catalogues, converses with fruit men, and examines the market reports to ascertain what varieties are best for family use, and what sell best in the markets. He goes or writes to a nursery, and bargains and pays for those particular varieties. He takes them home, plants them according to the most approved methods, stakes them, cultivates and prunes them with great care for five, ten, or fifteen years. He visits his orchard frequently with his friends; shows them how nicely the trees are growing, tells them what kinds they are, and is continually looking forward with much interest and strong hopes to the time when he shall get returns in nice fruit, not merely for his family, but also that will sell readily in the market, and bring him an income during all his life, as well as to his children after he is gone. But alas!

when they come into bearing he finds them to be very different from the kinds he bargained for.

Instead of winter fruit he has summer or fall fruit, or even worse—only natural fruit—varieties for which he has but little or no use, and for which there is, if any, only quite a limited demand in the market, so that most of it has to go to waste. He has given his ground, his money, his time and labor for many years, for nothing. His hopes so long and fondly cherished have turned to ashes. Do you blame him if he is indignant—if he says hard things of the nurseryman who has so grossly deceived and cheated him? There are many such in every direction from this city. I have seen some of these and heard them talk. It would be difficult to imagine greater indignation than their looks and words expressed. Is it not almost a crime to be careless in such a business?

L. B. Baker said he agreed with Mr. Jones. He could not see why nurserymen should not be held responsible for the results of carelessness in their business as well as the railroad companies in theirs.

F. B. Johnson said he had recently been badly sold in the purchase of a lot of plum trees. He had agreed for those grafted on plum stocks, but those received were grafted on peach. He set them in a clay soil, with clay subsoil, and during the past wet season they all died. He asked Mr. Parks why nurserymen grafted on peach instead of plum?

Mr. Parks said peach were cheaper and grew faster, but of course were not as hardy.

Mr. Mann asked Mr. Parks if he ever grafted on wild plum stocks?

Mr. Parks replied that he had, but nothing was gained by it, and the wild plum stocks were a nuisance because of the many sprouts they sent up.

Annual Meeting.

The annual meeting was held in the capitol Dec. 11.

L. B. Potter of Lansing read a paper on exhibiting fruits, vegetables, and flowers, at fairs and society meetings, in which he advocated the distribution of flower exhibits among fruits, vegetables, and grains.

Dr. Marshall said it was quite important that all fruits exhibited should be correctly labeled. Many had fruits the names of which they did not know, and went to fairs, hoping to ascertain by the labels on fruits there.

A paper was read by Wm. Van Buren, on "Horticulture: Its Benefits, and what it Teaches," which is printed in full in another part of this volume.

A. L. Sturgis of Okemos exhibited a large variety of very fine winter apples, which he classified, named, and described their merits. He named, as the best five varieties for general use, the Red Canada, Baldwin, Northern Spy, Rhode Island Greening, and Wagener, and said he would like to add King of Tompkins County and White Bellflower.

L. B. Potter also showed some fine winter apples; one which he called Tewksbury Winter Blush was especially fine, and specimens were distributed for trial.

WASHTENAW COUNTY POMOLOGICAL SOCIETY.

PREPARED BY SECRETARY GANZHORN.

The officers for 1881 are as follows :

President—S. W. Dorr.

Vice Presidents—J. D. Baldwin, Dr. A. Conklin, Geo. Sutton.

Secretary—Jacob Ganzhorn.

Treasurer—Ewart H. Scott.

Executive Committee—Prof. Emil Baur, J. J. Parshall, Judge P. L. Page, Chas. H. Woodruff.

Climatologist—Dr. Alex. Winchell.

Ornithologist—Prof. J. B. Steere.

Botanist—Prof. Volney Spaulding.

The meetings averaged a good attendance during the year, and the number of members has largely increased. The effort which was made in the preceding year to make these meetings of a social character met with continued success. The society had a first-class organ made to order for their special use and have a full organized choir to furnish music and enliven and make the meetings more entertaining. In the growing season, as far as practicable, the topics for discussion have been on leading fruits grown in the county which happened to ripen at the time of the meetings. A good display of fruits and flowers was always a prominent feature at each meeting.

January Meeting.

The January meeting was devoted to the culture of the quince.

This fruit is grown in moderate quantities all over the country. It succeeds best on our elevated grounds; the oldest or largest trees are found in such locations. The sizes of orchards for market purposes range from 50 to 500 trees.

In the discussion, both the tree and bush form was recommended as best for the trees. Those favoring the latter form claim that the trees are more easily saved from the borer; as when one stem is cut off, there are others left to keep up the tree. Those favoring the tree form with but one stem as body, claimed that the ground about the trees can be better cared for, and that under this system the suckers are more easily kept down. Some advocated the thinning of the heads from time to time and slightly cutting back. It was said that the quince suffers from severe cold westerly winds, and therefore, whenever practicable, temporary shelter might be given them. A case was cited where the west row of trees in an orchard was saved by a pile of cord wood. Mulching the ground for the purpose of retaining moisture about the roots in the summer and for protection in winter, was said to be important. Muck, composted with stable manure, was recommended as an excellent mulch for the quince. Coal-ashes was believed by one to be a useful mulch and a preventive against the borer. Salt, about one quart to the tree when in bearing, was recommended. Twig blight in the quince was reported by one grower, though but very slightly injurious.

February Meeting.

The grape was made the subject for the February meeting. It is becoming a prominent fruit in the county, and the number of vineyards is rapidly increasing. Thus far the grape is mainly grown for table use, and no regular wine cellars are yet known in the county. The Concord was yet about the only market grape cultivated. For garden culture or family use a few other varieties are cultivated to a small extent, but are rarely found in the market. No serious grape disease is yet encountered; but in some localities the rose bug does some damage, and in some places the grape beetle has been a source of annoyance. A number of seedlings were originated here, which are attracting attention; one or more of which will probably become standard varieties.

The meeting was opened by a paper from Jacob Ganzhorn, of which a part is furnished.

W. Higly explained the formation of mildew on the grape, the substance of which is already made known or treated of in former reports of the State society.

J. D. Baldwin mentioned the use of sulphur successfully applied with a bellows, by a person on the islands in Lake Erie, for preventing this disease. In the discussion that followed, Prof. E. Baur said that he kept the Salem grape successfully till winter, and attributed the keeping quality of this grape to its thick skin. He believes that the Catawba can be successfully grown on our elevated lands, and has started the experiment.

Chas. H. Woodruff spoke of his seedling grapes, of which the one called White Ann Arbor he said was thus far the best of his seedlings. He recommends it as a good canning grape.

Jacob Ganzhorn stated that the high elevations of the county and throughout the State, rendered the temperature uniform, and favorable for the successful production of fruit, the same as the influences of the lakes. The grape did not require a high temperature, but wanted one as uniform as possible during the growing season.

President Dorr said that he believed those who cultivate well and intelligently make grape growing a paying investment. He thought the grape the farmer's fruit, and that it always ought to be on his table from September to January, and might be there, by judicious management, until mid-winter.

March Meeting.

The March meeting was largely occupied with local business and verbal reports from the delegates to the Hillsdale meeting of the State Horticultural Society.

"The Uses of Fruits" was the subject for discussion, and which was opened by J. Austin Scott. He said that when he settled on the Maumee river in 1834, wild plums, thorn and crab-apples, were the only fruits to be had. He believed that if the fruits we now have could have been had then, nine-tenths of the sickness incident to the settling of a new country would have been avoided. Fruits he firmly believed were health-regulating agents, and ought to be freely used and enjoyed by all.

Prof. E. Baur exhibited samples of apples, peaches, and grapes, preserved in various ways. He spoke urgently of the importance of saving the surplus fruits by drying and preserving in any practicable way. He made favorable mention of the "Zimmerman's Fruit Dryer," of which he has one in use.

J. D. Baldwin spoke favorably of drying the fruit that cannot well be shipped or sold from the orchard. Regarding fruit dryers, he said that he searched the market through thoroughly, and was most favorably inclined to one called "The Granger Fruit Dryer."

Judge P. L. Page spoke in hopeful terms of the improved fruit dryers, and of placing fruit culture on a more substantial footing. He thought that the fruit-grower could not run the risk of disposing of all his fruit in a green state.

April Meeting.

The April meeting was very largely attended, and great interest was manifested in the topic under consideration, Vice President J. D. Baldwin being in the chair. The subject for discussion was "Insects Injurious to Fruit."

J. D. Baldwin opened the discussion and spoke substantially as follows:

The subject before us is of vast importance and which is well for us to study carefully. We are constantly confronted with insect life, which threatens and often, to a large extent, destroys our property. To successfully battle these foes should and must be one of our most important operations in conducting our business. We must not go to sleep over this. A wash consisting of lye and soap-suds for apple trees is said to be effectual in destroying the bark louse; copperas water is also recommended. The codling moth is a formidable enemy to the apple-grower. Air-slacked lime thrown over the trees in the right time will bring down the worms; it is also used, and in the same way, to destroy the curculio on plum trees. Another method, by some employed in destroying the codling moth, is sprinkling the trees with a mixture made of Paris green and water, put on with a fountain pump. London purple is now introduced as a substitute for Paris green, which, it is said, is as powerful in destroying insect life. It is used in a diluted form, the same as Paris green. The cost of the London purple is much less than the Paris green. It is sold for five or ten cents a pound. The sprinkling is done while the tree is in blossom.

The twig borer on quince trees, in particular, I think is bad. They may also be kept at bay by the use of slacked lime. I have used this remedy on the plum and peach with gratifying results. The lime is also good for destroying the curculio on the apricot and nectarine. Fallen fruit should be picked up immediately on dropping to the ground and either thrown to the hogs or otherwise destroyed, thus destroying the worms.

The rose bug is also sometimes found to be very injurious to grapes and to other fruits. Air-slacked lime is used for this insect, also, with good effect.

An insect known as the flea-beetle is in places found destructive to grapes. The beetle eats out the center of the bud as it starts in the spring, thereby destroying the fruit for the season. Sheets of tarred paper are put under the vines and the beetles jarred upon them. The tar holds the beetles, and when filled with them the paper is tarred over again. About three jarrings at intervals are sufficient to overcome this pest. It is important that we fruit men come together and exchange our experience and observations with one another, and thereby arm us to successfully cope with the obstacles thrown in our way in pursuing our business. Let one and all unite with us in fighting the insect tribe, and thus by a combined effort we will conquer. Last year I lost all of my apples by the codling moth, but this year I shall start in time, and try the fountain pump on them.

Prof. Emil Baur.—My principal method in destroying these insects is by making little fires throughout the orchard in the night. The lights draw the

moths and millers into them and there they perish. By heading them off in this way, the use of poison is not needed. I am not favorably disposed to the use of poisons. In connection with the fires or lights used, I prepare a sticky substance out of soft soap, to which I add a little molasses. The sweet substance attracts the moth, and the sticky part holds them. This is put on sticks about four feet from the ground. One man cannot successfully combat against the enemy in this mode of warfare, but if all the neighbors unite in it, the insects will be thus exterminated. I think where the work is carried on in a neighborhood a barrel of naphtha could be bought cheap, and this would make the most practicable light. I understand that the female of the canker-worm does not fly, but is attracted to the lights or fires, and is thus made to perish. Carbolic acid diluted with water I find an excellent wash for trees, and also believe it keeps off the borers. I am informed through a German that water in which tomato leaves were steeped would kill insects. I have been very successful in growing the German Prune, and have saved the fruit from the curculio by throwing ashes on the trees, from time to time,—beginning when the tree was in blossom. But above all remedies for destroying insect life I believe the little fires or lights the best, for by this means we in a large measure head off the depredators.

Dr. W. W. Nichols.—Mr. Baur, how near to each other must or should the lights or fires be in the orchard?

Mr. Baur.—I use from three to four for an orchard of about 500 trees.

Mr. Baldwin.—I have used little fires for destroying moths with good results. It has just come to my mind that a gentleman at Ypsilanti used salt around his plum trees, which kept off the curculio, and he thus saved his plums year after year. I am satisfied that the use of salt is of more value than we are aware of. I have no doubt but that it can be used for all our fruit trees. It has a two-fold use: it fertilizes the ground and kills the insects in their embryo state. Last year I started to draw coal ashes which I put around my peaches. There are probably little or no manurial properties in the ashes, but I have every reason to believe that it keeps off the peach borer and keeps the ground moist and friable around the trees. It seems to me also that the ashes have the power of drawing moisture, in times of a drouth, out of the atmosphere. This spring I have drawn from a thousand to two thousand bushels for my peach orchard. I put on three to four bushels around each tree.

Dr. W. W. Nichols.—I tried coal ashes last year around a few hundred currant bushes, and found a decided good effect from it. This spring I had it put around 2,000 bushes. I believe in it from what experience I have had with it thus far.

Wm. P. Grooves.—Your remedies for destroying insects seem to me to be too expensive, and may cost more in some instances than the value of the fruit. I have been considerably troubled with a worm in my apple orchard which ate the leaves, leaving only the skeleton. The worms appeared suddenly, and have in the same way disappeared. I very much fear them for the future, and have therefore studied largely on some possible remedy. After learning all I could for the best means with which to fight the worms should they come again, I have concluded to use some kind of a force pump and try the Paris green.

Dr. W. W. Nichols.—I have a pump which throws a stream of water sixty feet. It cost \$8.00. The pump can be adjusted so as to throw a spray which would be just the thing for sprinkling a dilution of Paris green on the trees.

J. W. Wing.—I would like to say a few words on the subject under discussion. The codling moth is our greatest foe. We do well to fight the cause,

as Prof. Baur suggested; but if we cannot succeed here, I believe we had better use the Paris green before giving up our crop. The female of the canker worms crawls up the trees but the male flies.

May Meeting.

The subject for discussion, "Injurious Insects," was continued from the last meeting. Vice-president Baldwin stated that he had received circulars from the manufacturers of London purple, a poison for destroying insects, a substitute for Paris green, which is effective and safe to use. Mr. Baldwin said that the London purple he believed was decidedly preferable to Paris green and is much cheaper than the latter. It is recommended by the eminent entomologist, Prof. Riley, of Missouri, and others. The London purple is used in a diluted form, the same as Paris green.

The secretary read the views of Prof. A. J. Cook, of the Agricultural College on the codling moth, from a recent issue of the New York Tribune. The methods recommended by the professor to destroy or combat the moth, are by bands and by keeping swine in the orchard.

J. W. Wing said one of the most important ways to get rid of insects is almost entirely overlooked. The birds! They are of incalculable service to the farmer and fruit grower. The birds are worthy of our tenderest sympathy and closest protection. The speaker fully agreed with Prof. Cook's recommendation in keeping swine in the orchard. We ought to keep some kind of domestic animals in our orchards to pick up the fallen wormy fruit. They greatly assist us in keeping insects at bay. He knew of no instance where hogs had done any harm to trees in orchards.

Judge P. L. Page spoke urgently of the importance of forbidding hunters to hunt on premises of farmers as they are the means of driving off the birds. The importance of the birds to our welfare is recognized by all governments. The law is stringent enough to protect them, but the people do not carry it out. It is highly recommended to all to post up notices on their premises, forbidding hunters on the grounds. It is well for us to use moral suasion in keeping out these depredators, but when this fails we should avail ourselves of the law.

Mr. Baldwin remarked that it is remarkable what strong instincts birds have in finding the insects from underneath the bands put around trees. They bring forth insects with wonderful ingenuity.

President Dorr gave his experience in warfaring with insects and highly recommended swine for orchards. He said that he now keeps twenty-five hogs in his orchard of 3000 trees and has kept a large number of them in his orchard for many years past and with uniform good results. He does not ring his pigs but lets them root freely; he finds no injuries done to the trees by them. He rather likes the effect of the rooting. The president recognized the importance of the birds and was careful in protecting them in all ways. He helps his boys in putting up little bird houses around the yard and orchard. He spoke forcibly in favor of keeping fowls in orchards, and said that he keeps 100 White Leghorns for this purpose. He also said that his brother-in-law, who lives along the side of a railroad and about forty feet above the road-bed, always has a good crop of plums without doing anything to prevent the ravages of the curculio; but attributes this success to the coal smoke of the engines.

N. B. Covert said that boys with guns, and dogs following at their heels, do much mischief to birds, and ought to be kept out of orchards and fields. He

advised all to post their lands with notices forbidding all such nuisances on their places.

Mrs. N. H. Pierce read a paper on the "Influence of Music and Flowers."

The purchase of an organ was favorably considered, and the executive committee was instructed to take the matter in hand.

June Meeting.

This being a strawberry meeting, the doings were mainly confined to the discussion of strawberry culture. A good display of different varieties of strawberries cultivated in the county was made.

J. D. Baldwin exhibited the Jucunda, Berge's Seedling, Monarch of the West, and Seth Boyden; J. Austin Scott, Seneca Chief; Jacob Ganzhorn, Charles Downing and Wilson's Albany; Chas. H. Woodruff, his seedlings known as No. 1 and No. 2, and a few other new varieties of his own raising; Prof. Emil Baur, Russell's Prolific.

Mr. Woodruff was called upon by the president to open the discussion. He explained the merits of his seedlings. He had found them through a series of years to prove very satisfactory for a market berry. On being asked how they compared with the Wilson for productiveness and size, he said that they were fully equal in that respect to that variety, and held their size better to the end of the picking. He claimed to have always received a little more in the market than was paid for the Wilson. In size, the berries of those seedlings were about the same as those shown of the Wilson,—large and attractive in appearance. His soil is a sandy loam on which he grows these berries.

J. D. Baldwin gave the merits of the varieties he had on the table, giving his preference rather to the Berge's Seedling, which was originated in Massachusetts. He found this and the Wilson the most prolific berries out of the 14 varieties grown on his ground.

Prof. Emil Baur said that the birds on his place were more partial to the Russell's Prolific, Jucunda, and Sharpless,—all superior table berries. The first named is a favorite berry with him. In this connection he mentioned that the public does not appreciate the better quality of strawberries, as they continue to buy and prefer the Wilson; and for this reason he cultivates the better flavored berries for his own table, and grows the sour Wilson for the market.

Prof. B. E. Nichols said that he neglected to cover his strawberry plants last winter and believed that the reason for his poor crop this season. He spoke highly of the Triomphe de Gand as a berry of very high flavor, but he does not succeed in getting large crops from it. He spoke unfavorably of Col. Cheney.

N. B. Covert said he had tried the Triomphe de Grand but did not succeed with it. He is marketing the crop of a half acre of the Wilson the present season. The plants have wintered well he said, and their main protection was grass which grew up in the plantation. He does not, however, approve of this way of protection, the grass being the result of an aged plantation. Straw was spoken of as a good mulch for both winter and summer use.

Prof. Baur grows strawberries between his peach trees, and wherever the peach tree leaves have mulched the plants in the winter he has the most fruit. He believes these leaves to be a good protection for the strawberry plant in the winter. In places where the leaves did not fall upon the plants or were blown away, the crop is much lighter.

Prof. Alex. Winchell interested the meeting by giving his experience with the troublesome birds. He greatly deplored the loss of his cherries by these depredators. The blackbird he censured most, as he had the most reason to complain of this bird. He felt rather annoyed that the city authorities forbid a man protecting his property by prohibiting the right of shooting these ferocious birds. It being intimated that the birds also mitigate the troubles of the fruit man by destroying insects, to which the professor replied that he never observed one of these birds to catch a worm so long as there was fruit to be secured.

N. B. Covert arose to defend the feathered tribe, as he called them, and said that he would take all birds sent away by others.

Mr. Scott also had reason to mourn the loss of his cherries by the birds, and mainly charged the theft to those known as the cherry bird.

Prof. Nichols also attributed the loss of much of his fruit to the birds.

July Meeting.

J. D. Baldwin, the acting president, who was one of the delegates to the State Pomological Society recently held at Battle Creek, made a brief verbal report upon the same.

Secretary Charles W. Garfield of the State Pomological Society, being present, was introduced and addressed the meeting. Mr. Garfield briefly touched upon the bird question which was up before the meeting, and said that we ought to well consider the matter before taking sides either for or against any bird, and while he desired to give the birds their proper credit in assisting the fruitman to keep down the destructive insects, he also keenly felt the losses of his best fruits by them. But his address was mainly devoted to the working of the State Pomological Society. He said it was a missionary work carried on by lovers of horticulture. He spoke highly of the beneficial influence these pomological societies exert over the refinements of the people, and expressed the desire to see all in the family interest themselves in these meetings. He was pleased and surprised at the large acreage of fruit culture about Ann Arbor, and spoke highly of the many well-kept residences. The locality he thought very picturesque, and certainly one of the most beautiful places to live in in the State. He had recently organized a number of local horticultural societies, auxiliary to the State society, and while so engaged he said he often took occasion to impress upon the farmers and communities the importance of embellishing their homes,—making their homes attractive, and by this means the young people would be more contented to remain at home.

Prof. Nichols and J. Austin Scott concurred with the important suggestion of Mr. Garfield in regard to the strengthening of family ties through the embellishment of homes.

After the reports of the committees on the exhibit, Mr. E. E. Baldwin gave a very entertaining address on "Fruits of Mississippi."

Special July Meeting.

A special meeting was called July 20th for the discussion of early peaches, and there was a fine exhibit of fruit.

Dr. Conklin spoke of the Early Curtiss peach. He gave the origin of this new variety and spoke of its merits. He said that he was highly impressed with its value, and therefore set out a large number of trees. The doctor believed this to be a richer and a firmer peach than the other early varieties.

He picked the first ripe specimens on the 8th of July. He kept his peaches and plums from becoming wormy by besmearing the bodies of the trees a foot from the ground with a mixture of common grease and sulphur, putting in as much of the latter as would stick to the grease. Plum and peach trees not so treated, 50 feet away, had all the fruit destroyed by the worms.

Mr. Dorr spoke of the value of the Early Curtiss peach. He became acquainted with it about nine years ago, in harvest time, and was at once favorably impressed with its merits. He felt confident that this peach was a little earlier than the other early varieties.

A committee was appointed to report upon the peaches upon exhibition, and after some discussion the preference was given to the Curtiss over Hale's Early.

August Meeting.

The August meeting was occupied by a paper read by C. H. Richmond, which we give in full, on

THE RIGHTS OF ORCHARDISTS AND PROTECTION AGAINST MARAUDERS.

The first branch of the subject, "The Rights of Orchardists," I take it, or rather interpret, as meaning the legal rights of the fruit-grower to the property and products of the orchard, the garden, and vineyard, and his rights to control and protect the same from the depredations of every person who may be disposed to unlawfully injure, destroy, or dispossess him of them. With this interpretation of the first branch of the subject, it may be well to inquire whether the legal rights of the orchardist to his property and its lawful protection under our laws are materially different from those of the farmer or any other class of our citizens. I think they are not, and I think that upon examination it will clearly appear that the underlying principles in all our laws for the protection of all the property of all the citizens of the State are the same.

It is true there are different kinds of property, for the protection of which there are in some cases special enactments or laws, but in most cases the law of itself is inadequate as a means of protection. It affords protection no further than the fear of the penalty and disgrace of its violation acts as a restraint upon the offenders, and the infliction of its penalty prevents the violators from opportunities for further depredations.

How far the owner of an orchard or vineyard may use the prerogative of his muscle as a means of defending his property, and what means other than the law he may use, are questions which may very properly be considered as embraced in the subject you have proposed for discussion. I take it that the word "marauders" as here used is intended to mean persons, lawless persons, who commit trespasses and depredations upon the property of the fruit-growers and farmers in various ways, and from different motives and objects. These persons may very properly be divided into three classes: plunderers, thieves, conscious and unconscious trespassers. The first are a class of roving, unprincipled individuals, who commit their depredations upon any favorable opportunity, chiefly in the night-time and on Sundays, sometimes from motives of gain, but mostly from pure cussedness; they are not scrupulous about leaving evidences of their having been present, for they seem to take pleasure in breaking down and destroying, as well as converting and carrying away. The second are a class who carry on their depredations in a more systematic way; they steal for gain; professionals, working mostly in the night-time, and are very careful not to leave traces of their work further than the absence of the

property they carry away. The third are a class mostly of juveniles, some of whom are very sly, take to thieving naturally, and are conscious of doing wrong; others of this class are too young to realize fully the wrong, and believe the proprietor of a fruit orchard a mean man if he will not allow them to take off even the unripe fruit as they want.

Now, it is in the experience of every fruit-grower to know some of each class I have described. In some localities they have been and are still quite numerous. How can the orchardist and fruit-grower effectually protect his products against their depredations?

He may use the prerogative of his muscle, he may employ others to watch and catch, and he may invoke the protection and aid of the law and the law officers.

If he exercise his personal prerogative he may use all reasonable and sufficient means and force to arrest or eject a thief or trespasser on his premises; but may not shoot, maim, or use any unreasonable or deadly weapon in so doing, to his injury, for he will be liable at law for damages unless the injury be done strictly in self defense. And so he may not place any deadly instrument or device, dangerous to life or limb, such as trap-guns, deadfalls, poisons, or the like in his orchard, fields, or garden for the purpose and intent of injuring any person who may unlawfully enter, and on the plea of protecting his fruit or otherwise, for the law regards such devices as imperiling the lives of the innocent as well as the wrong-doer, and cannot be allowed or justified upon any grounds whatever.

"Every man's house is his castle," is a common law maxim! And a man will be justified, and his servants will be justified, in killing, by any means at hand, a thief or burglar who enters and attempts to rob or murder him. Not so may he or they do to a trespasser on his orchard or garden.

It is evident that the employment of a police force sufficient to fully protect each and every orchard would be too expensive and is therefore impracticable.

It may be possible, but I doubt if practicable, for the fruit-grower to erect a fence around his property, which, either in its construction or material, will prove an effectual barrier against depredators. He may, and perhaps to some advantage, keep, for a like purpose, a *live* fence in the shape of a dog, but he must be careful that the character of his dog is good, and his disposition and temper is not habitually vicious, and that his intelligence is sufficient to distinguish, if allowed to act on his own responsibility, the intentional trespasser or thief from the person of honest intentions, or he may involve, by his indiscretions, his owner in trouble, more serious and expensive than the loss of the fruit he is kept to guard and protect.

Let me now direct your attention to some of the provisions of law which are directly applicable to the subject under consideration:

First, any person who shall enter a vineyard during the months of August, September, and October, and eat or carry away any of the fruit of such vineyard, without the consent of the owner or occupant of the same, shall be liable to a fine for each offense committed of five dollars or twenty days imprisonment in the county jail, or both, in the discretion of the court.—C. L. '73, chap. 245, laws of 1869.

Any person who shall willfully and maliciously or wantonly and without cause cut down or destroy, or otherwise injure, any fruit tree, or any other tree not his own, standing or growing for shade, ornament or other useful purpose, or shall maliciously break down, injure, mar, or deface any fence belonging to or inclosing lands not his own, or shall maliciously throw down or open any

gate, bars, or fence and leave the same down or open, or shall maliciously or injuriously sever from the freehold of another any produce thereof or anything attaching thereto, shall be punished by imprisonment in the county jail not more than one year, or by fine not exceeding one hundred dollars.—C. L., chap. 181, sec. 49.

And when the damages from the offense committed as above stated in section forty-nine shall be to the owner of said tree or trees to the amount of twenty-five dollars, the penalty shall be imprisonment in the State prison not exceeding five years, or imprisonment in the county jail not exceeding one year, or fine not exceeding five hundred dollars, in the discretion of the court.—C. L., chap. 181, laws 1835.

Any person who shall willfully cut down or destroy any timber, or carry away any timber cut down, * * * or any fruit, root, or plant, * * * or any grass, hay, or grain standing or being on the land of another, and without the leave or license of the owner, of the value of five dollars, shall be punished by imprisonment in the county jail not more than sixty days, or by fine not exceeding one hundred dollars.—C. L., chap. 181, sec. 51.

Every person who shall willfully commit any trespass, by entering upon the garden, orchard, or other improved land of another, without permission of the owner thereof, and with the intent to cut, take, carry away, destroy, or injure the trees, grain, grass, hay, *fruit* or vegetables there growing or being, shall be punished by imprisonment in the county jail not more than thirty days or by fine not exceeding twenty dollars. And if any of the offenses mentioned in this or in the preceding section (51) shall be committed on the first day of the week, or in disguise, or secretly in the night, the imprisonment shall not be less than five days nor the fine less than five dollars.—C. L., chap. 181, sec. 52.

The law provides that any person who shall wrongfully take and carry away any fruit tree, ornamental tree, bush, plant, vine or vegetable with the intent to deprive the owner thereof of the same; or shall with wrongful intent detach them from the ground or injure them in any manner, shall be guilty of a misdemeanor, and on conviction may be imprisoned in the county jail not more than six months, or fined not exceeding \$250, or the court may impose both.—C. L., chap. 181, law 1855.

It will be found upon examining the laws to which I have referred, that the statutes define the nature and degree of the various offenses which may be committed by depredators, whether crimes of greater or less degree, and have made definite provision for the punishment of each.

It is a principle of common law that "the intent and the act must concur to constitute the crime." Children between the ages of seven and fourteen are *prima facie* incapable of committing crimes, while those above the age of fourteen are subject to the same rules of construction as those of full age.

The legislature of 1873 passed a law for the formation of companies for the detection and apprehension of horse-thieves and other felons.—Session laws 1873, page 55.

Under the provisions of that law, any ten persons, residents of this State, may form a company, by signing articles of association: stating the name of the company, the name and residence of each of its members, and file and record the same in the office of the register of deeds in the county in which a majority of the members of the company reside. When the articles of association are so recorded the company will be a body corporate, and may sue and be sued; may appoint officers and define their duties; may admit and expel members; may hold and possess real and personal property to the amount of ten thousand

dollars. Each and every member of the company, when engaged in arresting offenders against the criminal laws of the State, shall have all the protection, rights and privileges of constables, and may call to their aid the peace officers of the State, in accordance with law, in the pursuit of felons and reclaiming stolen property.

I call your attention to this law, believing that under its provisions a company can be organized that may and will be of service in protecting the property of the fruit-grower, as well as in the detection and apprehension of thieves.

September Meeting.

This was one of the best attended meetings the society has ever held, and one of unusual interest to the commercial fruit grower. There was a large display of the fruits in season, and also a fine display of flowers.

The society thus far has been in the habit of discussing the fruits that ripened about the time of the meetings, and took up the peach as the subject for discussion, it being the most prominent fruit at this time in the county.

Prof. Emil Baur discouraged the planting of so many peach trees, as he was fearful the matter was being overdone.

Mr. J. D. Baldwin said: I would plant more later varieties than we have heretofore done. The Smock is safe to plant, and I would plant something that ripens ten days later. There is no danger of injuries by frosts on our high elevations. The Troth's Early does well with me on a sandy soil, but on heavy clay it does not grow as large, and I intend to replace it with other varieties where found on such soil. I am confident we can make the peach reasonably profitable if properly managed.

J. Austin Scott.—I was both gratified and amused in listening to the preceding speakers. If properly managed, fruit culture on an average is profitable. I believe if a strict count were kept by the peach men of this vicinity, a fair profit remains. I consider a high clay spot most favorable for ripening early peaches. The kinds of peaches and also the markets should be studied. I do not believe in planting too many of one variety. By having earlier and later varieties we may often catch something by having some of our dishes right side up when the rain falls. Wheat and other products are sometimes overdone, but for all that we should not be discouraged. The country was never more prosperous than to-day. I think, like friend Baldwin, that there are ways open out of the apparent troubles.

Judge P. L. Page.—I think it not becoming in us to complain because high prices were not paid for the peaches the present season. In some of the eastern States, where the peach is largely grown, the peach men experienced similar difficulties until they learned how to preserve fruits in various ways as now put up for the trade, and then the business became permanently and firmly established, and on a paying basis. I am of the hope that there will be some practical way to take care of our soft fruit that it may be profitably saved.

Dr. M. A. Conklin.—As to varieties, the Early Crawford is planted too largely. I have but fifty trees of that kind. I planted largely of the earliest varieties. I would urge the importance to plant varieties of early and late and so spread over as large a space of time as possible. In regard to soil I find that on a sandy soil and a southern slope, peaches ripen the earliest. It is so with all fruits. I would set late varieties on a northern slope.

J. D. Baldwin.—I think Prof. Baur ought to be cheered up. We have now passed through the worst of the present season. We want to plant more

of the earlier and later kinds, and thus more fully balance the business. I cleared last year, out of a small part of my orchard, \$3,000 and \$400 for field crops, which I grew between my young trees not in bearing. Out of this I paid for growing and marketing the crop, \$1,900, leaving me \$1,500 profit.

The day for holding the October meeting happened to come at the time the county agricultural society held its fair, and therefore, after preliminary local business, the meeting was adjourned.

There were two meetings held in November. The business was principally on arranging for the annual meeting of the State Horticultural society, which was held here at Ann Arbor, in acceptance of an invitation from this society, in December, 1880.

The utilization and sales of the peach crops were discussed, and a committee was appointed to more fully consider the subject.

December or Annual Meeting.

The committee on the utilization and sale of our peach crops made their report, which was accepted. This matter was laid over for future action.

After the preliminary business of the meeting was transacted the society proceeded to the election of officers for the year 1881, the result of which will be found at the beginning of this report.

BERRIEN COUNTY HORTICULTURAL SOCIETY.

PREPARED BY SECRETARY REEVES.

This society was organized August 21, 1880. The officers for 1881 are as follows:

President—R. C. Tate, St. Joseph.

Vice Presidents—S. G. Antisdale, Benton Harbor; W. A. Brown, Stevensville; S. H. Comings, St. Joseph; D. N. Brown, Benton Harbor; J. H. Feather, St. Joseph; R. C. Thayer, Benton Harbor.

Secretary and Treasurer—C. E. Reeves, Benton Harbor.

These officers constitute the executive board, with full power to enact laws, remove negligent officers, fill vacancies, call meetings, etc., and have charge of the annual exposition.

Regular meetings are held quarterly, the time and place being selected by the board.

The annual meeting for election of officers occurs on the second Wednesday of December. The first or preliminary meeting was held at St. Joseph August 7th, at which time committees on framing a constitution and soliciting memberships were appointed. Several interesting questions were discussed, among which were causes of premature leaf dropping from plum trees, blackberry rust, pear blight, etc.

The first regular meeting was held at Benton Harbor August 21, when a constitution was adopted and officers elected to serve until the annual meeting of 1881.

Special Meeting Sept. 18.

This meeting was held at Benton Harbor, and quite largely attended by fruit growers, who were drawn in by the expected discussion of the peach yellows and the law relating thereto.

S. H. Comings read a letter from a friend in New Jersey, which stated that peaches were now growing to perfection there in regions devastated by the yellows but a few years ago. Mr. Comings offered two questions for consideration: First, whether this latitude was not north of the natural peach zone, and thus unfitted to compete with Delaware and Maryland; and, second, whether peach growing was longer profitable in view of present low prices.

D. N. Brown, in reply to the latter query, said that the present low prices were the result of shipping diseased fruit, and not from over production, and that good fruit could not now be sold readily simply because purchasers were so often deceived and feared the disease.

S. G. Antisdale presented at length some recent investigations, going to show that the disease was a fungoid growth upon the under side of the leaves.

After a prolonged discussion the society adopted the following:

Resolved, That this society advise the immediate enforcement of the peach yellows law in the several townships of this county.

Special Meeting December 23.

At this meeting, also held at Benton Harbor, S. H. Comings read an essay on

IMPROVEMENT OF SWAMP LANDS FOR FRUIT AND OTHER PURPOSES.

which is given as follows:

For several years past my attention has been particularly called to the value of swamp lands for fruit and other purposes. For ages these swamps have been the receptacles into which have been wafted the falling leaves from the surrounding uplands, and into which the wash of the floods has brought abundant elements of fertility, which have been here well preserved by water from the dissipating effects of the air, and are only waiting for the skill of man to give up their rich stores in abundant and long-continued crops of most desirable products.

All about us these swamp lands are lying idle and useless, yielding their annual crop of *town, county, and State taxes*,—profitable to the tax collector, but sadly unremunerative to the owner.

The cranberry and whortleberry, two of our most universally popular fruits, are natives of these swamps, and have grown luxuriantly among the ferns and mosses, until the fires of the white man have destroyed them.

The cranberry has become almost extinct in a wild state, and the whortleberry so scarce as to bring higher prices than almost any of our most popular cultivated berries, and will soon disappear from our markets unless its culture is undertaken, and the proper means for its profitable growth learned. The price for whortleberries has been from \$2.00 to \$4.00 per bushel for several years past. From my observations I am well satisfied that the berry can be as readily improved in size and productiveness by improved conditions of growth as the cranberry, and similar conditions of summer drainage and winter flooding seem to favor its best growth; and as it would require no annual expense for culture, it would be a very profitable fruit.

Like all other new branches of agriculture this will well repay care and study to know how best to reclaim these waste swamp lands, and to know which variety of fruit or crop is best adapted to particular lands. But this may not be a difficult lesson, and when studied, we may find, like the early miners in Colorado, that we have blundered over our richest "carbonates," and dug for less rich ores in other places.

I am told that much of the most valuable productive lands in Ireland were originally peat bogs, like our peat and muck swamps, which have been deeply and thoroughly drained, and are now almost exhaustless in fertility.

The whole country of Holland is also a reclaimed swamp.

Near Grand Rapids, in this State, I was shown a former floating-marsh, which has recently been reclaimed, and splendid crops of celery are now grown where a few years since was a worthless swamp.

In Connecticut large crops of onions are grown on reclaimed peat lands. This is rather strongly flavored "fruit," but quite valuable, withal.

From all these facts, it seems well worth while to be looking up our swamp lands, and endeavor by intelligent effort to so improve them as to obtain the valuable products they are so capable of yielding us.

The writer has cut from three to four tons of splendid blue-joint hay per acre, on land in Wisconsin that had been a deep, wet, floating cranberry marsh, a few years before. During a dry time a severe fire swept over it, and along

the lowest part the floods of water cut a channel from three to six feet deep, forming a good drainage ditch, the effect of which was to make one of the most splendid hay meadows ever seen.

President Tate presented a paper, which was read by Mrs. Tate, upon

GRAPE CULTURE.

Horticulture offers to its devotees the greatest field for study and reflection, while it adds to labor both pleasure and profit, thus encouraging us in a pursuit where every day teaches us its useful lesson, and every flower, and plant, and shrub, and tree, and vine makes known to man its wants, demanding of us our most careful study and most watchful care. Thus has the Great Creator arranged our surroundings, that while toiling in the necessary avocations of life we are at the same time drawing from labor the pleasures and enjoyments that lift the burden from our shoulders and change toil to pleasure.

But this is not all: while we enjoy the pleasure of labor we are also encouraged to look forward to its profits, and this I consider to be one of the principal objects of the organization of this society, and it is earnestly hoped that our efforts in that direction will not be without good results.

One of the subjects announced for discussion to-day is "Grape Culture." I would therefore beg to trespass on your time for a few moments while I present a few remarks on preparation of the soil, condition and preparation of the young vines preparatory to planting, the manner of planting, and the care after planting, including staking, trellising, etc., and will also add a few words in regard to some of the newer varieties of grapes; but, before doing so, I must first assure you that you will hear but little that is new, the whole field having been so thoroughly and so wisely traversed by the many eminent writers who have presented us with so much valuable information on this subject during the last quarter of a century that I scarcely find room for personal identification. I will therefore endeavor to be governed by the practical, leaving theory to those who prefer it.

The preparation of the soil will be the first matter to be considered. This work should commence a year before planting, if possible, when, if the subsoil comes too near the surface, say 8 or 10 inches, a subsoil plow should be used and three or four inches of the subsoil brought to the surface for atmospheric action, the whole surface thoroughly worked during the season, and again well plowed late in the fall. Thus, by turning up the subsoil, the concealed gases therein would be liberated and come in contact with the gases of the atmosphere, creating a chemical change in the soil and rendering it in a condition to yield the most nourishment to the young plant the following year. In the fall plowing already mentioned, I would suggest that it be plowed in ridges or lands ten feet wide and so arranged that the dead furrow will come between the rows of young vines when planted, that is, assuming that it is desired to plant the vines ten feet apart each way, which distance I consider the best under ordinary circumstances, though the Concord and other vigorous growers might be improved by increasing the distance to fifteen feet.

Prior to planting the following spring the harrow should be freely used, so as to make the surface have a thoroughly smooth and clean appearance. Then stake the centers of the ridges at distances ten feet apart, putting in a good, strong stake, say seven or eight feet long and not less than three inches in diameter; drive the stake well down into the subsoil and tamp it in thoroughly. Then dig the holes, commencing on the south side of the stake and slanting downward and outward at an angle of about forty-five degree, so that when

completed the side of the hole next to the stake will have the appearance of the section of a slightly flattened cone, the outer and deeper part of the hole forming nearly a half circle.

The next thing to be considered is the condition of the young vines as they come from the nursery, and their treatment prior to planting,—and before doing so, will state that I believe good, strong, one-year-old vines from cuttings make a more vigorous growth and more healthy vines than do those of two or three years. And it is my experience that not more than one out of a thousand will fail to grow.

When young vines arrive from the nursery in the spring they frequently have a dried and shriveled appearance, having been kept in a cellar all winter, and possibly been two or three weeks in transit. From these causes many of the vines become exceedingly dormant and nearly exhausted, therefore requiring immediate care. They should at once be unpacked and placed in a pit, in a slanting position head downwards, and well covered with fresh earth, and, as soon thereafter as convenient, should be taken out, a bundle at a time, and thoroughly pruned. When a bundle is taken from the pit the hole should be filled at once with earth, so as to keep the air from injuring those still remaining. The pruning should be done in the cellar, or some equally cool room in an out-building, and a large tub of water kept at hand into which the vines should be thrown after pruning. When the whole bundle has been pruned, they should then be taken from the water and carefully tied up and heeled in until required for planting, making sure that the labels appear plainly above the ground, so that the varieties can be easily distinguished.

In regard to the necessary pruning of the young vine before planting, I am aware that there is a great diversity of opinion. I will therefore state, that my experience is greatly in favor of what might be termed short pruning, that is to say, cut back the main cane to six or eight inches, and closely remove all side shoots; then cut the roots back to twelve or fifteen inches, carefully removing all broken or injured roots that remain. And if too great a mass of roots exist, some should be entirely removed. This done, the vine is ready for planting. In planting the vine, the hole having already been made and the stake well set, the top of the vine should be brought close up to the stake and two or three inches above the surface, the roots well spread, care being taken that none be allowed to cross. Then throw in an inch or two of fine loose surface earth and pack well down with the hand; then, if convenient, throw in a shovelful of well rotted compost, or a handful or two of bone-meal, spreading it thoroughly. Fill up the hole nearly level with the surface, tramping in the earth during the process of filling. Secure the label to the stake, and the work is done.

It might be well to note here, that when plants are taken from the pit for planting in the vineyard they should be kept covered as closely as possible, and a few at a time plunged into a pail of water and taken out as planted. This will greatly assist them in their early struggles for a new existence.

The next thing in order is the cultivation and care of the young vine during the first year. By the middle of May, or soon thereafter, the ground should be neatly and carefully plowed, throwing the earth away from the vines, and a few days later it should be cross-worked with a three-shovel plow or deep-running cultivator, keeping at least two feet from the grape-stakes; then hoe around the young plants—not merely a scraping off of the young growing weeds, but a thorough cultivation with the hoe, and from this time to the middle of August the cultivating and hoeing process should be repeated at least

once in two weeks, after which a season of rest should be allowed, to permit the plant to perfect its growth, and ripen its wood, preparatory to encountering the force of approaching winter.

During the first year but one cane should be allowed to grow; this should be the strongest sent forth by the vine, and when eight to twelve inches long should be tied to the stake, all others rubbed off, and the rubbing off repeated weekly during the growing season. The main cane should be kept well tied up during the season, to encourage the flow of sap to the top of the vine. This will have the effect of discouraging the growth of suckers and laterals, the eyes around the lower part of the vine becoming so dormant as to give but little trouble afterwards. In the latter part of October the plow should again be used, this time throwing the earth up to the young vines, and before the winter sets in, cut back the canes to eight or ten inches, and cover thoroughly for two or three feet around with coarse barn-yard manure. This will not only protect the young vines during the winter, but will give additional strength to the soil the following season.

The first work to be done the second year is removing the mulching used during the winter. This should be done as early as the first of May, or earlier if the season is forward. The manure used for mulching should be well spread over the vineyard, and plowed under about the middle of the month, when the same course of cultivation should be kept up as recommended for the previous year—only that the plow and cultivator should be run less deeply.

And in training, two canes should be allowed to grow, in place of one the year before. These two canes should be those proceeding from the two uppermost eyes on the last year's cane as cut back, and should be kept tied up in manner like those of the first year, and the rubbing off process carefully attended to.

The fall plowing should be done at the same time and in the same manner as in the year preceding, and, if possible, the mulching should also be attended to, the object being to induce the growth of roots and to add to the vigor of the vine that is to come into leaving the next year.

After the fall plowing is done the second year, the two canes of each vine should be taken from the stakes, and all laterals cut away close to the main cane, and the canes cut back to five or six feet,—that is, assuming that the canes have made a growth of eight to ten feet during the season. As the stakes will no longer be required they may be removed and put away to be used again when needed. When the canes have been pruned, they may be laid down and covered with coarse manure, or any other coarse mulching, or a little earth may be thrown upon them, and, I assure you, they will pay well for the extra care in the years to follow. This brings us down to the spring of the third year, which in the life of the vine is a very important period, as from this date on it is expected to give some returns for the labor and care expended upon it. But before this good time begins, we must add to its already large indebtedness a not inconsiderable sum for posts and wire, and the labor of erecting a thoroughly substantial trellis.

The posts should be secured during the winter before, and at once distributed throughout the vineyard; the poles can then be made, and the posts set as early in the spring as the weather will permit. I would recommend posts to be seven feet long, and not less than six inches in diameter, and should be set in the ground three feet and thoroughly tamped. The end posts of each row should be ten to twelve inches in diameter, and after being tamped solidly should be well braced. The posts should be set thirty feet apart in the rows,

and a straight line carefully maintained. I would also recommend using No. 10 galvanized wire, which I consider the best, and in the end the cheapest, and if well stretched when put up will not sag with the heaviest crop of fruits. Galvanized wire will not corrode, and will therefore last many years longer than the common annealed wire.

When the posts are all set then stretch the wire, and draw it as tight as it can be strained, and fasten to the posts with staples, the lower wire thirty inches from the ground, and the upper one on top of the posts, which should be just four feet high. It may be readily observed that I favor but two wires for a trellis. When the trellis is completed the vines should then be raised and tied loosely to the wires to allow room for growth. A strong tarred string makes the best tie. Each alternate vine should be tied to the lower wire, and the intervening one to the upper wire. The vines intended for the lower wire should be tied together, rather loosely, a few inches below the line of the wire; then spread the arms to the right and left along the wire, and tie securely every twelve or fifteen inches, allowing each arm to gradually reach out to its next neighbor, ten feet away; thus the vine in its bearing form would have two bearing arms ten feet long. Those intended for the upper wire should be twisted one arm around the other (not tightly) and made fast to the lower wire, then another twist and a tie, a little below the upper wire, and the arms then stretched along the upper wire to the right and left, and tied same as the lower.

In this way each vine is made to occupy the room of the other without interfering with it, with abundance of room underneath for cultivation and free circulation of air.

When the trellising is finished, and the proper season has arrived, the plowing and cultivation can then be proceeded with, same as in other years, only that the plow and cultivator should now be run very shallow, three or four inches being deep enough, as the roots will by this time have filled the soil for the whole space between the rows, and often within six to ten inches of the surface.

After the vine has been thoroughly trellised, and has come into full bearing, it only requires the annual pruning, and frequent and careful cultivation to make it soon repay the large indebtedness it owes, and thereafter make large deposits to its credit for many succeeding years. I know of no other fruit grown in this section of country that will pay for cultivation half as well as the grape.

In my experience with summer pruning, I have found it to agree only with a few varieties, such as the Hartford and Diana, while the Concord and Catawba appear to be positively injured by it. How it will agree with the newer varieties I am now testing, I can tell better a year hence.

I will now say a word or two about some of the newer varieties I have been testing, and will name them in the order as I consider them the most desirable, naming what I esteem as the best, first:

Brighton.—This is a new, dark-red grape of excellent quality, and I am inclined to think the best of the new red grapes, being tender and sweet, with a rich sprightly flavor; is a strong, healthy grower, and a great bearer; ripens about with the Hartford.

Worden.—This I consider the best black grape extant. It is a strong grower, a good bearer; ripens early, and will carry its fruit without shriveling or dropping for a month after ripe, and retains its foliage to the end of the season; it is sweet, tender and delicious in every respect.

Lindley.—A beautiful, bright red grape; bunch large, berries large, tender and sweet, with a delicious, sprightly aromatic flavor; is a good keeper, and a prolific bearer; ripens about with the Hartford; vine a vigorous grower, at the same time being very healthy and hardy.

Perkins.—A beautiful pale lilac or flesh-colored grape, with white bloom; bunch medium to large; flesh sweet and juicy, with a slight foxy flavor; vine a strong grower and a good bearer; ripens early.

Agawam.—A beautiful red, or amber-colored grape; bunch large and loose; berries large, tender, and juicy, with a peculiar rich, aromatic flavor; vine a strong grower, healthy, hardy, and prolific; ripens about with the Concord.

Martha.—An excellent white, or greenish-yellow grape; skin very thin; meat tender and sweet; slightly foxy, but lacking sprightliness; bunch and berry medium; ripens with Concord.

Lady.—A new white grape of fair quality, with thin skin, meat tender and sweet, though rather flat, and, in fact, but little better than the Martha; bunches medium, berry large, ripens with the Hartford.

Goethe.—This is an excellent late grape, of beautiful appearance, bunch large and compact, berries large and oval in form, of a yellowish green color, tinged with red on one side, and, when fully ripe, is a rich amber, almost transparent, strongly indicating foreign blood, and somewhat resembling the Malaga; flesh sweet and juicy, with a delicious aromatic flavor; a good keeper a strong grower, and very productive.

Champion.—A new early black grape of medium quality, becoming quite sweet when fully ripe; is a very robust grower and the most productive of any grape I have tested; bunch medium to large; berries large and compact; ripens with me 1st to 10th of August, and will remain on the vines for a month later without shriveling; will make a profitable early market grape.

In addition to those I have already named, I am now testing some twenty or more varieties which will come into bearing next year, after which, if desired, I will make known the results; and feeling, as I do, that there is no other fruit grown in this country that equals the grape, I earnestly desire that each and every member of this society will make a special test of a few kinds, in hopes that we may yet, not in the distant future, find the variety which will contain every element of perfection. The person who will discover such a variety and bring it up to perfection in this neighborhood will receive the grateful thanks of the whole community, and will be sure of a large pecuniary reward.

We find in the sacred writings that a certain gentleman of high reputation planted a vineyard in the neighborhood of Mount Ararat over four thousand years ago, which is the earliest date I am able to establish when this favorite pursuit of ours was undertaken by man.

I cannot help but regret that the same authority fails to give us further information in regard to the success of Noah as a vineyardist, but we have reasons to presume that it was not a failure, as he seems to have gone into the wine business soon thereafter and got deplorably intoxicated, and as is not uncommon in these days, under such circumstances, he became very abusive and cursed a certain member of his family.

Now, while I would recommend all to emulate Noah as far as planting a vineyard is concerned, I would deeply regret that any one should follow his later example as above referred to. But let us consider a moment in regard to the fact that Noah planted a vineyard after the deluge. Now, the question arises, where did he get his instructions in this branch of husbandry? and

from whom did he get the young vines? Hubbard did not live then; Ellwanger and Barry did not live then; Purdy did not live then; so, where did they come from? The only answer is, he took them with him into the ark. So we are thus led to believe that grapes were grown long before the destruction of the old world—and even grapes may have grown in the Garden of Eden, in the days of Adam and Eve. Yet, I am unable to find anything in the history of those times that would confirm such a supposition, and am therefore inclined to the belief that they were not. Had they grown there at that period as delicious as they do here at the present, I think they would have been used by the tempter, in place of the apple, as, in my judgment, the temptation to eat would have been much greater.

On motion of A. R. Nowlen, a committee was appointed to ascertain whether there was in the State treasury any of the swamp land fund belonging to this county.

On motion of W. A. Brown, the society extended to the State society a cordial invitation to hold its next annual meeting at some point in Berrien county.

The present membership of the society is twenty-eight.

LIST OF MEMBERS.

J. W. Leslie, J. A. McCulloch, R. C. Thayer, L. C. Crittenden, S. G. Antisdale, L. M. Ward, A. R. Nowlen, H. Merry, D. N. Brown, C. E. Reeves, J. R. Stone, O. E. Mead, P. M. Kinney, R. Winans—Benton Harbor.

S. H. Comings, C. P. Phelps, Ira Overacher, R. C. Tate, G. F. Comings, Chas. Rogge, J. H. Niz, R. W. Van Brunt, O. B. Osborne, W. F. Peters, W. T. Jones—St. Joseph; Samuel Marrs, Stevensville; H. C. Sherwood, Water-vliet; Thos. Mason, Chicago, Ill.

COLON AND MATTESON POMOLOGICAL SOCIETY.

The officers for 1880 and 1881 are as follows:

President—Orison Tomlinson.

Vice President—R. E. Copeland.

Secretary—J. H. Clement.

Treasurer—G. W. Teller.

Executive Committee—Dr. Isaac Sides, W. H. Castle, Richard Dougherty, P. Farrand, Ansel Tyler, of Colon; R. E. Copeland, A. Turner, A. Fiske, G. Fulton, of Matteson; Wm. B. Langley, of Centerville; Henry Yanney, A. C. Prutzman, of Three Rivers.

This society was organized on the 8th of October, 1879, through the instrumentality of Orison Tomlinson and Dr. Isaac Sides, who labored assiduously to enlist the farmers and fruit-growers to assist in this laudable enterprise. On the day and date above named the first exhibit of the new society was held. Although it rained almost incessantly, yet a goodly number were in attendance and contributed of such fruits as were matured at the time, making the display all that could be expected under the existing circumstances. Some seventy-five plates of choice specimens of apples, quinces, pears, and grapes were placed on exhibition by Orison Tomlinson, R. E. Copeland, N. Turner, F. Judd, A. Fiske, J. H. Clement, and J. Hafer, as well as a number of house-plants, bouquets, and fancy designs by Dr. I. Sides, Mrs. E. Sides, Mrs. Elisha Hill, and Miss Lou Wilson, which graced the tables, together with several vegetables from Henry Wansey, Timothy Whitmore, and Jacob Hafer, all of which added character to the first effort of a few who were willing to sacrifice their time and means to accomplish the work so earnestly commenced by them.

At the close of the exhibit an election was held, resulting in the choice of O. Tomlinson, President; R. E. Copeland, Vice President; J. H. Clement, Secretary; G. W. Teller, Treasurer. Executive Committee—Dr. Isaac Sides, W. H. Castle, P. Farrand, J. Hafer, A. Hoyt, R. E. Copeland, N. Turner, E. Smith, A. Fiske, G. Fulton, after which the society adopted the name of Colon and Matteson Pomological Society. At the adjournment the time of next meeting was fixed upon as the 10th day of April, 1880.

April Meeting.

At this meeting a partial exhibit was held, consisting of green, dried and canned fruits, honey, cereals, plants, flowers, etc., etc. Among the contributors were O. Tomlinson, J. H. Clement, Mr. and Mrs. G. Teller, W. P. Teller, Mr. and Mrs. Dr. I. Sides, Mrs. J. H. Clement, Mrs. Permelia Hill, Mrs. Dr. H. C. Kimball, and Wm. Sharer. At this, as at the October meeting, the attendance was not large, yet the interest on the part of those who participated gave evidence that the society eventually must prosper and succeed. During the afternoon remarks were entertained from Chas. Sheldon of Burr Oak, W. B. Langley of Centerville, John Weeks of Mendon, O. Tomlinson, Dr. Sides, Prof. E. H. Crane, J. H. Clement, and Dr. H. C. Kimball, which were followed by a sumptuous repast by the ladies of the floral society, which was enjoyed by all present. After the cloth was removed, a vote of thanks was extended to the ladies for their courtesy and hospitality.

September Meeting and Exhibit.

On the 8th of September, the society having previously been solicited by the Floral and Art Association to unite with them at their 4th annual fair, accepted the invitation and gave the entire arrangement to president O. Tomlinson, who devised the staging for the fruit, etc. Nearly 300 plates of winter and fall apples, peaches, pears, quinces, grapes, blackberries decorated the stands, with numerous bouquets interspersed, which added much to the general appearance of the exhibit, making it attractive and inviting to the many visitors during the entire fair. We take pleasure in appending a list of the donors, to wit: W. B. Langley, O. Tomlinson, Dr. I. Sides, E. S. Schermerhorn, J. H. Clement, E. Farrand, Asel Rogers, R. E. Copeland, Dr. A. J. Kinnie, A. Bowers, J. Bowers, W. H. Castle, G. Moore, H. Whitmore, W. Snook, G. King, H. Moury, G. Teller, D. Ware, J. Cupp, E. Wagner, D. Wagner, E. C. Wellesley, H. Jacocks, Mrs. M. E. Rogers, Susie Rogers, Mrs. E. J. Schermerhorn, Miss M. S. Farrand, Mrs. A. McMellen, Mrs. E. Farrand, Mrs. G. Moore, Mr. Lear, Rev. F. Gage, W. P. Teller.

During the afternoon an announcement was made by the president that it was the request of the society that the audience assemble in the hall to listen to an address by C. W. Garfield, of Grand Rapids, the Secretary of the State Horticultural Society, whose services had been secured.

The address was listened to with marked attention, and was well appreciated.

After the usual order of exercises was carried out, the president solicited an increased membership to the society. The following is a list of those who connected themselves with the new society, to wit: O. Tomlinson, J. H. Clement, Dr. I. Sides, W. H. Castle, G. W. Teller, Wm. McCarty.

The efforts of a few were clearly demonstrated in their display, and evinced a determination to go to work earnestly the coming year.

COLON FLORAL AND ART ASSOCIATION.

The officers for 1880 are as follows:

President—Mrs. J. H. Clement.

Vice Presidents—Mrs. A. R. Hill, Mrs. E. Sides.

Secretary—Mrs. A. M. Banta.

Treasurer—Mrs. W. G. Davis.

Directors—Mrs. E. J. Schermerhorn, Mrs. Permelia Hill, Misses Maggie and Frank Farrand.

On September 11th, 1877, a few ladies and gentlemen interested in the culture of flowers and house-plants convened in Colon, at the residence of Dr. Isaac Sides, to discuss the subject of organizing a society for the purpose of holding a floral exhibit. The result was the formation of a society with Mrs. A. M. Banta, President; Mrs. E. Sides, Mrs. H. Miller, Vice Presidents; Miss M. S. Farrand, Secretary; Miss Frank Farrand, Treasurer; and an executive committee consisting of Mr. and Mrs. Dr. I. Sides, Mr. and Mrs. J. H. Clement, Mr. and Mrs. W. G. Davis, Mrs. E. J. Schermerhorn, Mrs. M. E. Rogers, Mr. and Mrs. J. Skinner, Mrs. Katie Miller, Mr. J. Farrand and W. B. Akey.

Success crowned our efforts, for "where there is a will there is a way," and on the 18th of September, one week from our first meeting, the floral fair was opened with a fine display of 500 pots of specimen plants, together with a great variety of hanging baskets, quite a number of floral designs, and an indefinite number of vases of cut flowers, interspersed with fancy work and paintings.

Our fair passed off admirably, not only as a pleasant entertainment, but also in a financial sense, so that at the close of it, the faithless (for there were many such), were obliged to be believing, and those who discouraged our undertaking at first were compelled to consider it a success.

At the second official meeting, elated with our achievement and with bright hopes for the future, the members of the association concluded to make the floral society a permanent organization, having for its object the awakening of a greater interest in the fine arts and the study and culture of flowers, which tends to elevate the thoughts and brings the mind in constant communion with nature, and brings out a beauty and refinement of taste which are never out of place. It was decided to retain the same officers, and to have a constitution and by-laws drawn up for the government of the association. The name Colon Floral and Art Association was also adopted. This year witnessed our fourth annual exhibit, with Mr. J. H. Clement, President. An increased interest is very perceptible every year both by members and others. The Colon Pomological Society united with us this fall in the exhibit, which greatly enhanced the pleasure of the entertainment. A proposition has been made recently by some of the members to unite both and become a branch of the State Horticultural Society, which we hope may be accomplished, as in union there is strength; but in so doing not to yield our individual character as a society.

THE SECRETARY'S PORTFOLIO.

INTRODUCTORY NOTE.

The Secretary's Portfolio is now looked upon as a fixed department in the annual volume of the Michigan State Horticultural Society. The newspaper notices all mention it favorably; letters without number from in and out of the State urge its continuance, and the multitude of excellent hints brought out during each year in connection with the progress of horticulture demands that a place for preservation and ready reference be given them.

The men who investigate, experiment, and draw valuable deductions, are rapidly passing away; but their experience and views we can save where they will benefit men for generations. It is the aim in this Portfolio to save only the best things. As the reader glances over the contributions, he sees that the authors of the gleanings here found are men and women whose opinions are respected. In preparing the copy for this part of the annual volume, I find it takes a great deal of time and thought. The aggregate amount of matter that is written and spoken upon horticultural topics during the year is immense, and very little of it is worthy of preservation. To gather as much of this as possible,—then to sift it several times, saving the best and trying to lose none of the really valuable matter; and at the same time looking out not to duplicate material in previous volumes, requires more of one than, appears in the resultant. I fall very far short of my ideal, but I can see that if time would admit of a more even distribution of the labor during the entire year, a more satisfactory collection could be gathered.

To the newspapers named in connection with the large number of extracts found in the Portfolio, I am largely indebted for assistance. I am especially grateful to publishers of the following journals for the volumes of 1880 sent me free of expense for this purpose: Rural New Yorker, Grange Visitor, Practical Farmer, Prairie Farmer, The Husbandman, Lansing Republican, Gardeners' Monthly, Kentucky Live Stock Record, Detroit Post and Tribune, Michigan Farmer, Farmer and Fruit Grower, Indiana Farmer, American Agriculturist, American Rural Home, College Quarterly, and Industrialist.

For purposes of reference and general convenience, I present the following analysis of the contents of the Portfolio :

A—POMOLOGY.

1. Scientific and experimental.
2. The nursery.
3. The orchard.
4. Apples.
5. Pears.
6. Peaches.
7. Grapes.
8. Berries.
9. Planting and transplanting.
10. Pruning.
11. Fertilizers.
12. Storing, marketing and preserving.
13. Birds and moles.
14. Insects and diseases.

B—FLORICULTURE.

1. Flowers and their culture.
2. Plants in the house.
3. Plant fertilizers.

C—LANDSCAPE GARDENING AND ARBORICULTURE.

1. Landscape gardening.
2. Ornamental planting.
3. Ornamenting school grounds.
4. Forestry.
5. Evergreens.

D—THE GARDEN.

1. Farmers' gardens.
2. Special vegetables.

E—MISCELLANEOUS.

SECRETARY.

SCIENTIFIC AND EXPERIMENTAL.

NO SECRETS.

There are no secrets in horticulture ; the laws that govern the germination of a seed, the rooting of a cutting, or the taking of a bud or graft, are the same as they were a thousand years ago, and any one pretending to have any secret knowledge in the matter is either an ignoramus or an impostor.—*Peter Henderson.*

HOW LONG WILL SEEDS LIVE.

Darwin and others have made experiments on seeds by immersing them in salt water. Out of 87 kinds 64 germinated after being in salt water for 28 days, and a few after an immersion of 137 days. Instances are on record too, of seeds of American plants, which have been washed on the shores of Western Europe, germinating after their long voyage across the Atlantic. Radish seed has been known to grow freely when 17 years old, and it is also recorded that kidney beans 100 years old, and rye 140 years old have germinated. So far as experience goes, prolonged vitality seems to depend on the nature of the pericarp, testa, or albumen, though there are some inexplicable exceptions. Thus, carrot will keep good four years, whereas angelica and parsnip (members of the same family), having more oily seeds, will only grow the first and second spring respectively after they are collected. The seeds of Australian acacias, which have a very hard dense testa, are long-lived, but the kidney bean, which belongs to the same family, rarely grows after the third season. Some seeds, for different reasons, are preferred two or three or more years old to quite fresh ones ; in some instances because the older seed germinates more

regularly as to time. Old balsam seed, other things being equal, has the reputation of yielding a larger proportion of double flowered plants than new, because its vital force decreases with age.—*Practical Farmer*.

SEED BEARING EXHAUSTIVE.

Every tree however hardy, will be hurt by heavy bearing. It is a strain upon the powers of the tree, lessening its vitality, requiring a year or more to recruit, and shortening the period of its life. The fruit fails, and largely, to come up to its usual standard, to say nothing of its highest condition under the best management. All this results from neglect of thinning out, an operation much less difficult than is supposed. Remove down to a moderate amount of fruit, which in a heavily laden tree is fully half the crop; often more should be taken. This relieves the tree, and enables it to concentrate on the rest of the fruit, greatly increasing the size and quality, which in market tells most. By lessening the number of specimens, the number of seeds is reduced; and it is this particularly that favors the tree, as the seeds draw sharply upon the tree's vitality. It has also the effect of favoring bearing the next year. We thus see how much can be done by this one operation. If all orchards were thus treated, there would be a revolution in fruit growing.—*Colman's Rural World*.

PRESERVING SPECIMENS OF PLANTS AND FRUITS.

We are often at a loss how to preserve specimens of fruits and other agricultural products. We have tried to keep an unusually handsome bunch of grapes or a "prize" apple, but have found that it shriveled up, changed color, or was otherwise spoiled.

Dr. Nessler, of the Experimental Station at Karlsruhe, has been very successful with a solution containing a little acid—sulphite of lime in 20 per cent spirits of wine. Alcohol alone has long been employed as an antiseptic, but when strong enough to prevent decay, it will usually affect the color or otherwise alter the appearance of the specimen. The fruit or plant should first be moistened with the alcohol and one to ten drops of an eight-per-cent solution of the sulphite added. The specimen is then covered with the alcohol. In preserving leaves and other substances liable to change color, not more than one or two drops of sulphite to every four ounces of the alcohol should be used. For roots, tubers, etc., which are liable to turn brown or grow dark-colored, three or four times the above quantity may be employed.

With this preparation specimens of white and green grapes, of green leaves, and of roots have been kept for years in a light room without any visible alteration. This liquid will also prevent wines from turning brown and check fermentation. It can also be employed to preserve insects, fish, or small animals.—*Rural New Yorker*.

WONDERS OF GRAFTING.

Hiram Stidolph tells the *Rural World* how he grafted a tomato vine on a potato, as follows:

I have this summer grafted a tomato vine on a potato vine. It is now grow-

ing finely. If it had not been such a dry summer, I think it would now be full of fruit, and I should probably have potatoes at one end of the vine and tomatoes at the other end. It has been grafted four months, and is now (Oct. 15th) full of blossoms. It is the most singular piece of grafting I have ever done. I have grafted white currants on black currants, and on red ones, and a gooseberry on a currant, which bore a gooseberry the first year. But grafting the tomato on the potato gave me more trouble than any grafting I ever did. The tomato vine looked sickly for a long time, but I shaded and watered it, and it finally grew and produced blossoms, as I have stated.

STOCK AND GRAFT.

As breeders improve animals by breeding "in-and-in," so, no doubt, varieties of fruits may have their faults reduced, and better qualities increased by grafting in-and-in on suitable stocks. An experimenter used to be very careful where he cut grafts of the Fallawater, for of two trees in the orchard bearing it, one was an Autumn sweet, and on that, the apples ripened and colored up in the fall, looking then like a different apple from the green, hard fruit on the other tree. These were finer and fairer, having a longer season of growth, and would keep till April. Mr. Talbot reported to the Massachusetts Horticultural Society a curious transformation of the Hightop Sweet through being grafted on the Red Astrachan. The fruit passed for Astrachans at the exhibition, having assumed their color and figure; and the judges were only undeceived by finding them as sweet to the taste as the original Hightop. Mr. W. Weston, of Winthrop, originated—so to say—an acid variation of the Porter, by grafting it on a vigorous tree which bore large and very sour fruit. The new strain is called the Cook's Favorite, and, no doubt, very fitly, for the typical Porter, while unsurpassed in its season as a high-flavored, handsome dessert apple, is equally admirable for cooking. It is the Spitzenburg of its season.—*N. Y. Tribune.*

PRESERVATION OF APPLES.

Prof. F. H. Storer, in the *Rural New Yorker*, gives the results of experiments performed by Sorauer in Germany, in keeping apples, as follows:

Three separate lots of the apples having been weighed out, one lot was spread on shelves in an ordinary fruit cellar, another lot was kept in air from which moisture had been pretty thoroughly removed by means of chemicals, and the third lot in air that was completely saturated with moisture. On re-weighing the several lots after the lapse of some time, it was found that the apples kept in the air of the cellar had lost three and a half per cent of their weight; those kept in dry air almost eight per cent; while those kept in air saturated with moisture had lost but little more than one-half per cent. It could not be perceived that any advantage was gained by using the dry air; on the contrary, the apples kept in the dry air shriveled more than the others, and manifestly ripened more rapidly, so that in the later months of the experiment they were less sweet than the others, and a larger proportion of them decayed. Not a few of them became rotten-ripe, and this in spite of the fact that, as was naturally to be expected, rather less moldiness appeared, as

time went on, upon the fruit kept in the dry air than upon that in the air which was saturated with moisture. The importance of hindering the fruit from coming too quickly to full maturity was further illustrated in these experiments by the fact that the first apples to decay were those which were the ripest,—that is to say, most mature,—at the beginning of the experiments.

It was found to be true of apples kept upon shelves in the cellar, that they gave off more water by evaporation in a given time when they were green than they did afterwards, as they became riper. It appeared also rather remarkable, in a trial between apples whose stems had been broken off and those whose stems had been left uninjured, that the latter lost rather more by evaporation than the former; the inference being that there is no harm in breaking the stalks of apples in the process of gathering.

Other experiments were made to determine how much influence the natural varnish on the skin of apples has upon their preservation. To this end, the waxy covering was removed from a number of apples by gently rubbing them with a mixture of alcohol and ether, then washing them with very dilute potash lye, and finally with much water. It was found that apples thus treated lost five per cent more of their weight, by evaporation, in a given time than apples which had been left in their natural condition and similarly stored. As regards this point, Sorauer is in full accord with the popular conviction that the unhurt skin of an apple is to be regarded as the chief protection against decay. He found that apples whose waxy coating had been left unharmed did not decay for a long time after he had smeared them with mold, although they were left all the while in a moist and warm place.

Still other experiments were made to test the question whether there is any advantage in packing apples, layer by layer, with straw or sand. Four kinds of apples were packed away in glass vessels, half of each lot in chopped straw and the other half in dry sand. It appeared not only that the sand was decidedly preferable to the straw, but that the use of straw is not to be commended. Although there was no loss through decay of the apples packed in the straw, they nevertheless shriveled more than apples which were lying free in the cellar, and they acquired a musty taste from the straw as it became damp. The use of dry sand, on the other hand, seemed to be advantageous, since the fruit packed in it retained an uncommonly fresh appearance and excellent flavor, and promised to keep, in good part, until July. The sand-packed apples lost only about half as much water by evaporation as those which were lying free upon the shelves; they were almost wholly free from moldiness, and when one of them happened to decay it did not infect the others. Even those apples which had been bruised did not decay any more rapidly than the sound fruit, provided that the skin had not been broken. Other apples were wrapped in tissue paper and compared with those left uncovered, both in a dry chamber and in the cellar. No advantage was derived from the paper excepting in the dry room, for in the cellar mold developed itself more rapidly upon the apples wrapped in paper than on those which were lying free.

It seems plain that the main points to be considered in storing apples are, to keep the temperature of the room so low that the fungi which cause decay cannot flourish, and to have the air of the room moist enough to hinder the fruit from shriveling. If the storehouse were warm, moisture would doubtless be injurious, since the conditions would be favorable for the propagation of the hurtful fungi; but if the room be cold enough to hold the fungi in check, moisture will do good rather than harm.

THE ART OF CROSSING PLANTS.

There are so many questions brought up each year concerning the cross-breeding of fruits, particularly about the details of the operation, that the following plain, simple directions from the pen of Prof. W. J. Beal are inserted here for ready reference. They are taken from articles furnished the *Farmer's Review*.

If we turn back and read the works on horticulture of one hundred and fifty years ago, we shall be surprised to see what little progress has been made in the essentials of the art. We shall see many things there clearly told which have since that time been again and again brought out as new and surprising discoveries.

The most conspicuous feature during all this time is the improvement by crossing or hybridizing the flowers. Something was known in reference to this more than two thousand years ago, but the knowledge was very crude and imperfect. For the past ten or fifteen years, in some portions of France, Germany, Great Britain, and North America, there has been great activity in this direction. The subject is of very great importance to any person who grows plants in field, orchard, garden, or greenhouse.

Some of us can remember when the belief was quite prevalent that the feed was the breed of our animals. If we fed well, no matter about pedigree. At present no man of any enterprise will maintain that he does not get greater returns for the feed given to fatten a well-bred or grade short-horn, than he would if given to a native or Texas steer. In a similar manner there is the same need of giving attention to breeding the seed for our crops. The same care bestowed upon good seed will often return twice the crop that it would bestowed on common or indifferent seed. Before closing, examples will be given to illustrate and enforce this point.

To succeed in crossing plants, a person needs some skill and a little knowledge of botany. Many persons look on the subject as one involved in great mystery, and hence avoid reading or giving it any thought. It should be frequently mentioned, and kept before the people in short articles which plainly show the process and the great advantages which may be gained.

HOW TO CROSS PLANTS.

Nearly every person of ordinary intelligence knows that there is something in the flowers of plants that answer to the male and female elements of animals. In the case of willows and poplars, one tree bears flowers all of which are destined to produce seeds; the flowers of other trees produce the pollen, or fertilizing dust. After flowering, the remains of the latter flowers fall off, producing no seeds. The same is true of hemp and the hop vine. In the case of oaks, chestnuts, hickories, hazels, walnuts, and many others, the stamens and the pistils (seed-bearing organs) are produced on different parts of the same plant. After shedding pollen, the lax and worm-like clusters of stamens drop off. In case of Indian corn, the pollen is in the tassel at the top, while the silk below represents the tips of the pistils. A thread of silk runs to each rudimentary kernel. Suppose we want to cross one kind of corn with another, for the purpose of getting new kinds; we will say a white flint with a yellow flint. We mix the seed corn, or plant the kinds in alternate hills, or in alternate rows, and the wind and the force of gravity attend to the exchange of pollen: provided the two kinds flower at the same time. The resulting corn will be well mixed.

But suppose we prefer to be more concise, and wish to fertilize the yellow flint entirely by pollen of the white flint. We will then plant the two sorts in alternate rows, and as the tassels of the yellow flint appear, pull them out. On these stalks we shall know the parentage of the corn.

Some strawberries, like the Green Prolific, bear few, if any, stamens, which produce pollen. Plant such among plants of the Wilson and save the seeds of the Green Prolific. We shall know the parentage of the seedlings. The Wilson is the father, the Green Prolific the mother. We can cross two kinds of cucumbers, or two kinds of melons, on a plan very similar to the one adopted for crossing corn. In one sort, before flowering, all the sterile flowers must be cut off. The sterile flowers are those which have no bunch or swelling below the yellow part. This bunch is the rudimentary melon or cucumber. In the case of the vines, bees and striped beetles and other insects carry the pollen from one flower to another, except when the plants are grown in greenhouses. In the latter case the flowers must be fertilized by hand, unless insects are let into the house for the purpose. To induce flowers to set fruit and seeds, pollen seems to be necessary, at least in nearly all cases.

In the examples given, the stamens and pistils were in different flowers on different plants or on different parts of the same plant. In the majority of cases, as in the flowers of apples, pears, cherries, plums, peaches, grapes, raspberries, most strawberries, gooseberries, currants, peas, beans, clover, buckwheat, wheat, rye, oats, barley, onions, cabbages, carrots, potatoes, lettuce, and many others, the stamens and pistils are situated near each other in the same flower.

In many of these cases the pollen is ripe and is discharged on a certain part of the pistil of the same flower, and causes it to set fruit and seeds, but in many other cases the stamens and pistils of a flower are not ready for contact at the same time. These must be cross-fertilized in some way. In many other cases, as in the orchids and milk weed, the flowers contain stamens and pistils, but they are so placed, even if they are ripe at the same time, that pollen cannot reach the proper place without some artificial help,—as a small bird, insect, or the wind. Many flowers are cross-fertilized, even when the stamens and pistils are both present in the same flower.

Suppose we wish to cross one kind of cherry with another and be certain that just the desired cross is made. While the flowers are yet unopened, in the swollen bud, we will spread the white petals and cut out all the numerous slender stamens, with their anthers at the top. In the very center of the flower is the rudimentary cherry, with a slender, light green stem running up among the stamens. This must not be cut off. The stamens must be cut out before shedding any pollen. We must not wait for the bud to open for another reason: the tip of the pistil might get dusted with pollen from another flower, not the sort desired. We may deprive two or three buds of the stamens, pull off the rest near them, and cover with a paper or fine muslin sack, closely drawn up at the mouth. In the early part of the next day, or possibly the next but one, remove the sack, and apply a plump anther (filled with pollen) slightly crushed, to the tip of the pistil. We select the anther, of course, from the other sort of cherry desired for the cross. The sack may be carefully replaced for a day or two, or better still, left on till the fruit is ripe, as this keeps away the birds and insects. This pollen may be applied to the tip of the pistil when the bud is just opened and the stamens removed. It will not produce any effect on that day, but it will remain and keep alive for a day or two or more, till the pistil is ready to receive it. If buds were so prepared,

and the pistils at once supplied with pollen, and not covered up, there would be a strong probability of a cross. Trees are sometimes planted close together. The flowers on the interlocked branches are visited freely by the bees, and pollen is thus carried from one tree to the other. The anther containing pollen can be handled with small forceps, and pollen thus placed where it is desired. The tip of the pistil (*stigma*) when ready to be fertilized, is usually covered with a sticky excretion. A little honey or syrup can be touched to the tip of the pistil to help hold the pollen in place, though this is hardly worth the labor. The flowers of peaches and plums are essentially like those of cherries. Apples, pears and quinces have five tips of pistils to each flower, surrounded in each flower by about twenty stamens. Raspberries and strawberries have many pistils and many stamens to each flower. Gooseberries and currants have two pistil tips and five stamens, surrounded by quite small petals and sepals. All of these flowers can be crossed much in the way given for cherries. In all the cases above it is well to leave the specimens covered with sacks until they are ripe.

Grapes are rather more difficult, and should not be attempted by the beginner, at least without assistance. In most of them the petals stick together at their tips, and come off altogether without expanding. To secure a cross in grapes, it is necessary to lift off the petals and remove the stamens before they are ripe enough to shed pollen.

It is by no means difficult for any handy person to cross-fertilize wheat or oats. Purchase some fine forceps. Before the stamens are ripe or are thrust out, spread open each pair of chaffs and carefully pick out the three stamens. Have near by another head or spike of the same age of the sort desired to use in crossing. From this take a single plump anther, not yet open, and place inside where the three others were taken out. Let the chaff close up, and pass on to each rudimentary kernel in the spike or head. No paper or muslin sack is needed. A person can cross a spike of wheat in an hour. There are but few people engaged in this crossing of wheat, and, as I shall show, the work is interesting, promising and profitable in more ways than one.

FREEZING OF THE SAP IN PLANTS.

In many discussions differences of opinions arise from failure of one side to grasp just what the other means. A good illustration of this is furnished by the following from the pen of Jno. Hovey to the *London Garden*: Does the sap of trees freeze? This is a question which has been in dispute, and some of your contemporaries here do not believe in the theory. Under certain conditions, however, there can be no doubt the sap does freeze, and under others probably not. So far as sugar and starch freeze, just so far a tree will freeze; but the sap does freeze. I have had strong plants of tea roses frozen so hard as to split open the stem and the exuded sap to completely cover the wood with a coating of thin ice; and I cannot doubt that any tree before it has finished its hibernation will freeze when the cold is severe enough. There is a row of Lime trees on Boston Common which freeze so hard in our severe winters as to open the trunk for the distance of twenty feet or more from the ground fully one inch in diameter. I have put my hand in the crack. Yet these same trees in July would show no more signs of the opening than a mere vertical line of extravasated tissue. I have recently read in the papers that trees in the *Jardin des Plantes* were split from top to bottom by the frost.

Now there is scarcely a person of experience in cold countries but has seen trees split from the top to the bottom by frost. If such persons still believe that "sap does not freeze," it ought at once to suggest that they understand by that, something different from what the one understands who calls attention to the split trees.

Now what is really meant is that the sap in living healthy cells does not freeze. If it did, every tree in Massachusetts would be as surely bound to split as the "row of Lime trees on Boston Common." A hundred bottles of water set on "Boston Common" would all split if one did. Frost knows no such favoritism as smiting one row of bottles and letting all the rest alone. The action of frost is always uniform under equal circumstances. But in a tree only a few outer rows of the woody circles contain living cells. All the interior mass of wood in a tree is simply dead vegetable matter. There is no reason that we know why crude liquids taken into dead vegetable matter should not freeze, and, when it freezes, it will expand. Many persons have seen ice in small spaces found in the interior of trees cut in the winter season. This dead matter allows of some expansion, and the little moisture it contains may freeze without any perceptible effect on the whole body of the tree. But if the interior happens to be spongy, as is very likely to be the case with old Lime trees, and a great deal of water happened to be stored therein, we know of no reason why it should not freeze, and the trunk burst just as readily as it would in a bottle.

But all this is a very different question to that of the freezing of the sap in living cells, and for the cells to still continue thereafter to possess vital functions.—*Gardener's Monthly*.

TRANSPLANTING BY NIGHT.

A gentleman wanting to ascertain the effect of transplanting by night instead of by day, made an experiment, with the following results:

He transplanted ten cherry trees while in bloom, commencing at four o'clock in the afternoon. Those transplanted during daylight shed their blossoms, producing little or no fruit, while those transplanted in the dark maintained their condition fully. He did the same with ten dwarf trees after the fruit was one-third grown. Those transplanted during the day shed their fruit; those transplanted during the night perfected the crop and showed no injury from having been removed. With each of these he removed some earth with the roots. The incident is fully vouched for, and if a few similar experiments produce a like result, it will be a strong argument to horticulturists, etc., to do such work at night.—*Indiana Farmer*.

ORCHARDS AND GARDENS IN VALLEYS.

Most of our gardens, from necessity or from choice, have hitherto been made in the valleys and plains, where, however, they are much more liable to suffer from the cold and damp of winter than on the hills and slopes. In our country the high grounds have never been used for gardening purposes to anything like the extent they deserve. The fact that a few hundred feet elevation often saves one from the destroying effect of spring frosts, is of enormous im-

portance in much relating to gardening and fruit growing. This fact is not only of importance to us—more liable, as we fancy, than other people to the injurious effect of spring frosts—but in almost every northern country we know of. In North America, for example, in some of the best fruit-growing regions, the planters are becoming thoroughly awake to the necessity of taking advantage of the ground, so to say. They are watching, like careful generals, for good positions so as to withstand the common enemy, frost. The observant growers have noticed and experienced in their own practice the great advantage from a few hundred feet of elevation, peach and other trees surviving in such positions when they perish in the valleys or in the low lands. The glowing sun which ripens the shoots so well, does not absolve the cultivator from counting with this important difference as to the growth of fruit. So, too, must we, if our country is to be as fertile in useful fruit as it should be. Let us make our orchards on the slopes and grow wheat and other crops in the valleys.—*London Garden.*

The above extract is given to illustrate the fact that upon both sides of the ocean this all important matter of "elevation in fruit culture" is receiving attention.

GRAFT HYBRIDS.

Mr. J. B. Stone, of Wacousta, asks through the Lansing Republican the old question whether an apple tree can be so grafted or budded as to produce an apple that will be half sweet and half sour, that is, so as to be perceptible? To this Prof. Beal replies as follows:

Your correspondent asks a question which has been going the rounds for a hundred years or more. During the past year there have been several questions and answers on this topic in the New York Tribune. One man says that his grandfather succeeded, by split buds, in producing a tree which bore apples, each of which was part sweet and part sour. I wrote for samples of the apples, which were kindly sent. They proved to be the old well-known "sweet-and-sour." The fruit of this variety has ridges running from calyx to stem; some of the specimens are ridged irregularly. The ribs, ridges, of prominent parts are decidedly acid; the hollows are sweet. This fruit is occasionally met at our fairs and meetings of the State Pomological Society. Dr. Warder, one of our most eminent pomologists, says: "No educated nurseryman will now believe the old story of its having been produced by the combination of the buds of two varieties, a sweet and a sour."

I suppose two half-buds can be made to grow together. If they should unite, I cannot see how we could get apples as above mentioned. We should expect all the apples to be alike which grew from one side of the united bud, and those alike which grew from the other half of the bud, or all alike which grew on the limb arising from the united halves of two buds. I know of no botanist, vegetable physiologist, or scientific person who now believes it possible to produce apples which are half sweet and half sour, by uniting two half-buds from trees, one of which bears sour apples and the other sweet. Still, there are persons who are certain that it can be done. Probably nothing that I shall write will change their views.

In 1876 Thomas Meehan, editor of the *Gardener's Monthly* since its organization, read a paper before the American Association for the Advancement of Science held at Buffalo, N. Y. He refers to the fact that an abutilon was caused to send out variegated limbs because a bud from a variegated plant was set in above it. Other cases of a similar character are well known. Mr. Meehan says that a few years before he grafted twelve split-buds; three of each grew. The half of each was a bud of the Rhode Island Greening and the other half the Red Astrachan. Two of the samples fruited; neither is Rhode Island Greening, and the two are unlike each other; one has a flower like the Rhode Island Greening, but a fruit in many respects like the Red Astrachan. He adds, "There is no doubt but two varieties, distinct from their parents, and distinct from each other, have resulted from this graft process. Some may suppose that the union of a Red Astrachan and a Rhode Island Greening apple should result in producing an exact intermediate, and that the union of buds in several graft cases should each produce identically the same, and therefore the two distinct varieties from the same process be a surprise. But no two children of the same parents are exactly the same. I am delighted with the scientific results proving that hybrids by bud-grafting is more than a popular delusion."

Notwithstanding the above statement of Mr. Meehan, most pomologists and botanists believe there is some mistake in the experiments. His conclusions are not generally believed, yet they may be correct. Without more exact experiments, there has been enough said and written on this disputed question. Like the question of wheat turning to chess, there is no end to it. We need experiments by careful, well-trained observers, and such only will decide similar mooted points.

THE NURSERY.

PLUM ON PEACH ROOTS.

For a number of years past we have experimented in the way of grafting and sending out each year a few Miner plum trees, root-grafted on seedling peach roots. So far as we have been able to learn, these trees have made less growth than those on wild plum roots, but that they have come into early bearing, and have proved very satisfactory and profitable. Three years ago last spring we put out about forty one-year-old Miner trees worked on peach roots on the College farm. They are now even-sized, round-topped trees, and well loaded with plums, showing little sign of damage by curculio. Miner trees on plum roots set seven years ago on similar soil exhibit their first fruit this year, and on an average they will give less fruit this year than the three-years-old trees first mentioned. In no case have we heard of damage to the peach roots during our test winters.—*College Quarterly*.

BUDDING THE GRAPE.

First cut off a piece of the wood from the shoot or cutting three or four inches long, with a plump bud well ripened at the middle; then cut away lengthwise half the wood, taking care not to destroy the pith at the woody base of the bud. Cut the ends with a sharp knife perfectly straight and smooth, and then place the prepared bud on the stem of the old vine to be worked over, and mark out the exact length and breadth of the piece to be inserted. Cut out a part of the stem sufficient to receive the bud with close fitting. Press the bud in, in firmly, and cover with clay or grafting wax. Several buds of different varieties can be inserted in one vine. When the bud has grown to form one leaf, the branch or vine beyond the bud should be cut away.—*Fruit Recorder*.

GRAFTING GRAPE VINES.

George Hussman, horticultural editor of the Rural World, finds the following the most successful way to graft the grape: Cut the cions in autumn, just after the first frost has stripped them of leaves. Keep them cool in damp but not wet sand or moss. Perform the grafting either quite early before profuse bleeding or else wait a month or so until the greatest flow of sap is over. Use a very keen knife; split the stock with a sharp blade, open with a wedge and hammer. Large vines require a chisel for splitting. Remove the earth from the root three or four inches down, if the vine is smooth, saw or cut off its stock square, cut the cion to a long wedge with two buds, press it firmly into the cut, as in other grafting, and then cover the whole to the tip of the cion with fine earth pressed down. Suckers from the stock should be promptly rubbed off. When the stock is small, tying may be required before covering the cion with earth.

GRAFTING WAX.

Melt together rosin, 6 lbs.; beeswax, 2 lbs.; raw linseed oil, 1 pint. Pour boiling water all around the sides of an ordinary washtub, so as to scald and wet the sides so the wax will not stick, throw out the water and fill half full of cold water. Pour the melted wax into this and work just as soon as cool enough to handle. I think you will like this better than any tallow wax, and it is not so liable to run in a hot sun.

J. S. WOODWARD.

Lockport, N. Y., March 24, 1880.

THE ORCHARD.

ROOT PRUNING.

The experiments were made on the apple and pear. A vigorous apple tree, eight or ten years old, which had scarcely made any fruit buds, has done best when about half the roots were cut in one season, and half three years later, by going half way around on opposite sides in one year, and finishing at the next pruning,—working two feet underneath to sever downward roots. It has always answered well, also, to cut from such trees all the larger and longer roots about two and a half feet from the stem, leaving the smaller and weaker ones longer, and going half way around, as already stated. The operation was repeated three or four years later by extending the cut circle a foot or two further away from the tree. By this operation unproductive fruit trees became completely studded with fruit spurs, and afterwards bore profusely. This shortening of the roots has been continued in these experiments for twenty years with much success, the circle of roots remaining greatly circumscribed. The best time for the work has been found to be in the latter part of August and beginning of September, when growth has nearly ceased and while the leaves are yet on the trees, causing greater increase of bloom buds the following year than when performed after the leaves have fallen.—*London Garden.*

GIRDLING FOR FRUIT.

I have often thought how pleasant it would be to me to visit my old agricultural and horticultural friends in this State, and look over their homes and farms and households, could I spare the time and means. I have recently indulged in two such visits, one to friend Drury's fine farm in this county, and one to friend Spaulding's model and premium nursery farm, at Riverton in Sangamon county, and I enjoyed it.

The judgment with which Mr. Spaulding has selected and prepared his grounds, as well as the well-known care and skill and success with which everything on the place is managed, indoors and out, most plainly shows that they are one "right family in the right place," and I hope there are multitudes more of them in our beautiful State.

Several hundred acres of the best woodland soil natural to trees have been selected, and the central parts of it thoroughly underdrained, even where quite dry and sloping, and covered with the finest and most perfectly healthy and well-grown fruit trees and nursery stock I have ever seen. The fruit trees at this time are a sight good for sore eyes. The first item is some 14,000 bearing apple trees with scarce a blemished or defective tree among them, and so loaded with such fine fruit, even those not three inches through, that they remind one of the gardens of Hesperides, except that no hideous dragon lies at the gate to guard them; but every one who came was welcome to his basket full, and the teams and men were hauling them to the watering mouths in the city as fast as possible.

What magic had produced this beautiful sight? That was precisely what I went up to learn, to see and to know. Good drained soil, girdling, lime, salt and an army-corps of 500 young turkeys, perpetually on the march in their different battalions, and the warbling light-armed troops skipping and singing among the branches there tell the whole story; they were at once cause and guard of all, through all these, the united head, heart and brain of the family selected, created and controlled, the proprietor's brain by common consent ever being the leading element.

It was the girdling in which I was most interested, for sixty years ago, on my father's farm in Massachusetts, I girdled fruit trees in the same way, and I have done it occasionally to truant trees and vines ever since. So when I read in Downing's most admirable book that girdling endangered the life and health of the tree I knew that there great Homer napped for a moment, and only repeated what others had told him, a mere hereditary dogma, for in sixty years I never knew a branch or a tree killed or injured by it. My recent way of doing it is to take a wide-set saw and saw a circle carefully clean down to the wood all round the trunk of the tree. Mr. Spaulding takes out from a quarter to half an inch in June with a knife, which takes longer, and I think is no better if as good.

I have pear trees and apple trees now, so girdled a year ago, on my place, loaded with fruit, which never bore a peck before, though some of them were ten or twelve inches through. But friend Spaulding has literally thousands of young trees not ten feet high, with all the branches bending down with the finest fruit I have ever seen, for among his 14,000 trees he girdled 3,000 last year. His experiment is a thorough demonstration beyond all doubt, for in some cases whole rows are girdled, and whole rows skipped; in other cases only every other tree in each row is taken of the same sort of apple planted at the same time. In every case the young girdled trees are loaded with the finest fruit, while the ungirdled ones in the same row or adjoining rows have none on them.

But will not trees so treated bear themselves to death? Certainly they will if not sustained; when they have worked up into good fruit, all the fruit food there is in the soil, be it more or less, they of course can do no more, unless new fruit food is supplied. Hence a young orchard should never be set out where an old one has been. But the man who sets the trees may as well use up that amount of fruit food which is in the soil while he is alive and can eat the fruit perhaps, as to set out the tree and leave it to his grandchildren to eat the fruit. I now have a girdled Lawrence and one Winter Nelis pear full of fruit, which I have no reason to think would have borne a dozen pears in ten years if they had not been girdled, and one Green Pippin apple a foot through, full of fruit, that has not before borne a peck in ten years of equally sound fruit. Besides an apple tree thirty or forty years old, away up in the air, seldom bears any fruit worth gathering, and it costs twice as much at least to gather it as it does from low, young trees, and if our apple trees can be made to bear four times the fruit in ten years what is the use in spreading it over forty years? Why not take it as quick as we can get it, and reinvigorate the soil or set out a new orchard and cut down the old one?

At all events I have come home in the full belief that this process, new in some sense but really older than I am, is destined to work a revolution in fruit-growing, particularly in the west, and I shall let my saw run without fear like a fiddler's bow to the new tune of the times, around my trees next spring, in

so far as they are not girdled this summer, or now at once, which will help them some next year, but not so much as it would had it been done in June. I think this practice will practically double the profit of our orchards to the present generation, so that we can well afford to set out a new crop for those who are to come after us. At all events, try it, friends, for yourselves, as carefully and cautiously as you please; but do not leave its benefits and your trees too wholly to your grandchildren.

Mr. Spaulding's explicit, truthful and candid presentation of his work and plans and purposes in regard to girdling, importing superior foreign varieties, hybridizing, etc., as published in the *Prairie Farmer* of Jan. 17, 1880, is profusely illustrated, and crowned with the most triumphant and undoubted success on his premises this year, as any one may see who will go there and look upon the trees and fruit with his own eyes as I have done. He has on hand a car load of lime and a car load of salt, and proposes to get a quantity of copperas to keep up the tone and vigor of his apple and pear trees under this wholly unprecedented strain of fruit production; but as his apples are not only more abundant, but much larger, fairer, higher colored, better flavored and sell more readily than common apples of the same sort, he can very well afford to feed them as he does his workmen on the best the land affords. Why cannot others afford to do the same, and make their trees twice as profitable to them as they ever were before. I should have said, that to demonstrate fully that there is no danger of hurting the tree, by girdling in June, he has girdled some at all widths, taking out all round the tree strips of bark from one quarter of an inch to twelve inches wide, and new bark readily formed, and not a single tree among the thousands is injured, only the sap is temporarily checked, compelling the setting and retention of the fruit buds and fruit.—*J. B. Turner in Prairie Farmer.*

CLOSE PLANTING OF ORCHARD TREES.

We are satisfied that trees are a protection to each other, hence we practice planting out our apple trees two rods apart, and peaches half way between, each way. The apples are a great protection to the peaches, especially from severe winds when fruit is ripening, and from cold, piercing blasts of winter. One of the finest young apple orchards we ever saw was in Northern Indiana—the trees being only one rod apart, and were just coming into bearing. They had been kept well headed back, but were getting so large when we saw them as to grow their limbs together. We asked the grower what his object was in planting so closely, and he said it was to break the piercing winds and give protection to each other *while young*. He expected soon to thin them out so as to leave the trees two rods apart. They had already yielded enough fruit to many times overpay for the cost of the trees and work, and besides, he would get a nice lot of firewood. We shall certainly set peach trees hereafter close together, at least, not more than fifteen feet apart, and keep them well headed back, and as trees get old have other orchards thickly planted coming on to take their place, for it is the young peach orchards that yield the finest fruit.—*Fruit Recorder.*

WHAT IS A GOOD TABLE APPLE?

It seems to me there is often misapprehension as to what really constitutes a good table apple. For the most part high flavor is alone considered. This is an important constituent, but not the only important one. Besides high flavor we should look to juiciness, and above all, to what is called the "dissolving properties" of a fruit. This is at once easily understood by illustration. The Spitzenburgh is one of the highest flavored apples we have, but its value as a table fruit has, in my estimation, been considerably overrated, for the reason that among all the popular varieties this is the most tough and indigestible. These serious defects go far toward nullifying its unquestionably high flavor. The Baldwin is similar in this respect to the Spitzenburgh, but without its high flavor, and therefore as a table fruit it is utterly valueless.

The Jefferis, Fameuse, Jonathan, and Northern Spy are none of them quite equal to the Spitzenburgh in flavor, but how far superior these are as dessert varieties any one familiar with them well knows. The reason of their superiority lies in their crisp flesh, which is yet so tender as almost to dissolve in the mouth. A chronic dyspeptic can eat these varieties freely, when to eat an uncooked Spitzenburgh or Baldwin would be sure to bring dire results. The four sorts I have named will ripen in the order given, and furnish a supply of fruit from early autumn to late spring. They are in my opinion the four best apples for table use yet produced.

H. B. ELLWANGER.

TWO VIEWS OF THE BALDWIN.

In the Gardeners' Chronicle for July 10 and September 4 are some notes concerning the Baldwin apple that are reminders of the various views expressed at some of our own meetings. The first article is from the pen of a Boston Horticulturist, Mr. C. M. Hovey, in which he remarks: "I was quite astonished to see an account in one of your cotemporaries, copied from an American paper, stating, upon the authority of Mr. Ellwanger of Rochester, N. Y., that the Baldwin, as a table fruit, is utterly worthless and could not be eaten without direful results. As I have not only grown it for forty years and eaten it before breakfast and after supper during all this time, in preference to any of the 200 varieties I cultivate, and have not experienced any 'direful results,' this statement took me by surprise." Mr. Hovey, in support of his opinion of the Baldwin, calls up Manning, Downing, and other American pomologists, the American pomological society's fruit catalogue, and the fact that the Baldwin is shipped to Calcutta with success and supplies the dessert of the intelligent Englishman's table.

The second article is by a Jamaica correspondent, who admits that, in its place, the Baldwin apple deserves its meed of praise, but ought not to be thrust upon people as *the* apple. He says: "Its principal claim to be considered one of the first apples is in its ability to stand rough usage consequent upon being transported by land and sea for long distances with but a minimum tendency to decay. In its home it cannot take rank with many other varieties, unless toughness of skin and harshness of flavor can be said to be recommendations in its favor. It is shipped to Jamaica as well as Calcutta, and it cannot be said to possess anything to recommend it, except it is (that excellent quality in po-

tatoes) mealiness. It may supply the 'intelligent Englishman's table with dessert,' but it is only when his pocket will not allow him to purchase higher-flavored and rarer varieties that are only to be found in the rich man's establishment. For market purposes, the Baldwin, no doubt, stands preeminent, but that it deserves the praise bestowed upon it I cannot allow without recording its faults to prevent others from being misled by your correspondent's opinion of its merits."

Our Michigan fruit catalogue grades the Baldwin, as a dessert apple, as 6 in a scale of 10, and there is some doubt if a single fruit-grower can be found in our State who would rank it higher as an apple to eat.

ODD YEAR BALDWINS.

When Mr. Ewer of Battle Creek, Mich., moved upon his present farm there were seven Baldwin apple trees upon it. Six of them came into bearing on the off year, and the following year the seventh bore and the six omitted. They have kept up that order ever since. He has grafted other trees from these and as they came into bearing they bore on the same years on which the trees from which their grafts were taken bore. One year, the odd, he plowed up the orchard in the spring, which had been in sod many years, and those trees which would have borne that year blossomed, but shed their blossoms; still they did not bear the next year, and waited till their regular year came round again, when they bore. Those that had borne on the even year adhered to their regular year without change. He has grafted many times since from the original seven, on different years, but they all followed their parent trees in their bearing years.—*Rural Home*.

THE BEN DAVIS APPLE.

Beyond all question the Ben Davis is the great market apple of Illinois and in states south and west of us. It was stated by well-informed parties at the State Horticultural meeting, that fully half of all the recent apple planting in Illinois had been of this variety. Other sorts have an equal local value, but no other sort succeeds in every soil and climate of the Mississippi valley like the Ben Davis. Of course everybody admits its lack of high quality, but as long as it brings a better price in every south-western market than any other variety, its poor quality will not hinder people from planting it. But its great popularity in the market illustrates anew the fact that it is beauty and not quality which sells all of our fruits.

With us at the South the chief defect of the Ben Davis is its early maturity. It don't keep well into the winter. This is a matter that can be remedied by using artificially cold storage for the first few weeks of our warm autumns. In Central Illinois, where the season is a month shorter than ours, it is a good keeping winter apple. Now, there is no reason in the world why the same apple grown with us, if equally free from insect and other injuries, should not keep equally well if placed in a cool preservative temperature when first picked. Further north it has become cool before winter

apple harvest; here we often have some weeks of almost summer heat after they are gathered. Secure cold storage for our apples and they will keep equally well. This need not be a very costly matter. A suitable fruit room with convenience for using ice is within the means of every man able to own a good orchard. Nature furnishes plenty of ice nearly every winter. I judge that fifty cents a barrel will cover the annual cost of the cold storage. Ben Davis apples sold this year at gathering time for about a dollar a barrel in our towns. They are to-day worth four dollars a barrel in St. Louis. Can our apple growers see any business in this?—*Farmer and Fruit Grower.*

SWEET APPLES.

There is a marked increase in the value placed on sweet apples. When most of our orchards were composed of seedlings, the farmer generally found sweet apples enough to supply the demand of his stock, and these were generally sweeter apples than those obtained from the most popular grafted varieties. These old orchards are fast passing away, and the seedlings, many of sterling worth, are lost. The farmer has been, so far, inclined to plant mostly for profit, and for that reason, of sour varieties. But now farm requirements demand a good selection of grafted sweets. Consumers, also, have been gradually educated to the great value of sweet apples for table consumption. It is the roast beef of fruits. What fattens the animal nourishes man, if it be palatable. The price of sweet apples is about the same as sour, and in early winter the demand is greater.—*Vt. Phoenix.*

THE APPLE MARKET IN THE FUTURE.

The farmer of an observing habit learns a lesson from the harvesting and marketing of each crop.

What is the lesson of the apple crop of 1880? First, that it has been the largest crop ever harvested in Michigan, and that it has barely paid the expense of handling; and in places remote from shipping points the only profit has been gained by a few days' work of man and team spent in hauling. Prime fruit has been sold at 50 cents a barrel, the buyer furnishing the barrels and packing the fruit, and leaving the owner to do all the rest. And yet the fact remains that nearly one-half of the orcharding of the State of Michigan has not yet come into bearing. Four or five years ago thousands of acres were set out to apple trees under the belief that the north and the west would always furnish a constant and ready market for all the fruit we could raise. But we find that both the north and the west are receding from us, and shipping rates are so high that the profit is eaten up by the expense. A disappointment is likely to arise also in the fact that very many of the young orchards will not bear the kinds of fruit expected, and also in the fact that many varieties not well tested will not meet expectation. In view of these things, let every one who contemplates planting an orchard think well before planting more than will be needed for home consumption, and see that only those varieties are planted as are of known merit. The mass of farmers cannot afford to experi-

ment in fruit. Again, the apple harvest has proved that it is folly to cultivate inferior or unmarketable varieties, or those which are shy or irregular bearers. If such trees in our orchards are thrifty and not too old, let them be top-grafted, and let the orchards be well cultivated, manured and trimmed, and if necessary the growing fruit thinned out, thus making a quality of fruit that will be sought after and command a remunerative price.—*J. E. Day in Post and Tribune.*

THE FLOOD OF APPLES.

For some reason the "bearing year" of apples seems to be the same all over the country, and is now the even years, and when it comes thousands of bushels rot in the orchards. The price for drying and cider making has been so low this season that it would not pay to pick them up and draw to the factories. What shall be done in such cases? Few know *the value of apples as a food for nearly all kinds of farm stock.* They make excellent pork; are fine for sheep; make the horses' coats sleek and smooth; make the finest quality of milk and butter. Properly fed they are worth at least \$1 per ton for any of these purposes. But *how to feed properly*, that's the important question. Begin by feeding small quantities, gradually increasing until the animals have all they can eat. There is no danger of over-feeding if this course is followed, but we should remember they are very juicy, and if fed in large quantities the stock should have some dry food, such as hay, bran, mill-feed, or corn meal to produce the best results. *To prevent choking*, place the animal with neck in stanchions, or between two stakes driven firmly in the ground, and through holes bored at the right height place a pin or bar over the neck at such a height that the head cannot be raised quite level with the body. This is a sure preventive of choking in feeding apples, potatoes, or anything of the kind.—*J. S. Woodward, Niagara Co., N. Y.*

SETTING ORCHARDS.

Mr. William Saunders, the distinguished horticulturist in charge of the public gardens and grounds at Washington City, observes that the outside rows of trees in an orchard always grow more thrifty than the interior rows. He attributes this to the cultivation of the soil in the fields alongside of the orchard, giving room for the ramification of the roots in cultivated soil. He thereupon suggests that trees be set in two rows, twenty-five to thirty feet apart, then a space of 300 feet or more, and two more rows of trees, and so on over the ground, the intervening 300 feet of ground to be cultivated in such crops as may be desired, and the space between the rows of trees to be put in grass as soon as they begin to bear. He thinks the cultivation of the ground would keep the trees healthy and conduce to their bearing fruit. Mr. Saunders thinks double rows of trees would shelter the crops between and be beneficial in that way.

KEEPING WINTER APPLES.

A writer in the Rural New Yorker says: That water is not injurious to the keeping of apples, even when actually in contact with them, is shown by the fact that they keep perfectly well on the ground under leaves all winter. A friend of mine living in Montreal says that seeing some very fine Fameuses exposed for sale in that city, he inquired how they were kept. He learned that they were part of the cargo of a canal boat which had sunk in the canal and was frozen in before it could be raised. When this was effected in the spring, it was found that the cargo of apples, which would not have kept much longer than January in the air, had been preserved perfectly in water. An old custom of burying apples in the ground, the same as roots, for winter storage, also demonstrates that moisture in contact with apples does not necessarily cause rotting. In Russia I understand that apples are preserved in tight barrels with water, in the way practiced in this country with cranberries. On the other hand, apples keep perfectly in dry cellars, as many fruit-growers can testify. What then is the essential requisite for the safe winter keeping of this fruit? Simply, I believe, the preservation of a low uniform temperature, as near the freezing point of water as possible. This can be maintained in dry cellars, but much more easily and perfectly, I think, in wet ones. The presence of water has a controlling power over the variations of temperature near the freezing point, as all know who have had to keep water in a cold cellar to keep it from freezing. The moisture does no harm to the apples.

SHEEP IN THE ORCHARD.

A correspondent of the Vermont Journal gives the following interesting experience in keeping sheep in an apple orchard:

My apple orchard covers thirty-two acres of ground, and, in addition to making it a run for some thirty hogs, I have, during the past two years, kept from 150 to 200 sheep and lambs in it during the summer. Of course that amount of land, if it was in good seeding and free from trees, would not pasture so much stock, but in addition to the pasture I feed enough grain and wheat bran to keep them in such condition that the lambs shall be large enough to wean in July, and the sheep sufficiently thrifty to accept the buck after weaning the lambs, and thus drop their next lambs for early winter feeding next winter.

This, I find, costs me less than to hire the same number pastured by the week, and being crowded they eat every spear of grass, every weed and green thing close down, and eat every fallen apple as soon as dropped; for the latter purpose I find sheep much better than hogs, for while the hogs sleep so soundly as not to hear an apple drop if only a few feet away, a sheep never sleeps, so that it is on hand for every apple as soon as it touches the ground.

I let them run here until time to gather winter fruit, and although they will eat a few apples and a few twigs from the ends of the lower limbs, as they bend down with the load of fruit, I find my fruit each year growing fairer, with less and less wormy apples, and my trees, manured with the feeding of so much grain, are looking remarkably healthy and are productive. To prevent their gnawing the smaller trees, I wash the trunks with a solution of soap-suds, whale-oil soap and sheep manure, about once each month, and besides I give the sheep a constant and full supply of fresh water; this is very important,

for in hot weather they get very thirsty and will eat the bark from larger trees even, unless they have plenty of water.

I like this manner of treating my orchard very much; what it would cost me to hire the sheep pastured each week will buy at least 600 pounds of bran and 400 pounds of corn, making an aggregate each summer of over ten tons of the very best kind of fertilizer for an orchard. For the money I pay for feed I get my sheep kept in the finest condition, have the lambs growing finely all summer, and have the whole amount of feed bought (which is worth all it cost for the purpose) scattered about the orchard in the best possible manner. Thus, you see, I prove that it is perfectly practicable to "eat my cake and have it, too," or in other words, to get twice value received for the money invested, besides having codling moth successfully trapped.

PROTECTION OF TREES FROM THE SUN.

Trees suffer more from the effects of the sun, directly and indirectly, than the majority of tree-planters will acknowledge or comprehend. Very often the unhealthy condition of trees is attributed to various causes, such as "poor stock"—fault of the nurseryman—soil, insects, etc., whereas the first cause of trouble is improper exposure to the sun. Young trees are trimmed up by cutting off all the side branches by the nurseryman in order to give the tree a good appearance, which is very well as long as the tree remains in the nursery, for there it is protected by its neighbors; but when set out in orchard rows, the long, smooth stem will suffer more or less by the exposure to the sudden changes of temperature caused by the sun, and unless well staked is very apt to lean over from the winds, in which condition the sun's rays strike the tree more directly, causing the bark on the exposed side to decay, and making it attractive to insects. Apple trees in this condition are very sure to be attacked by the flat-headed borer (*Chrysobothris femorata*, Lec.). The insects and sun together soon ruin a tree.

In reference to apple trees especially, I think they would be healthier and longer lived if we would copy after nature more than we do. For example, if we allow an apple tree to grow up from seed, never turning or crowding it, we will have nothing more than a large bush; but, you may depend upon it, there will be no sun-burn on that tree, there will be no flat-headed borers, no sap-sprouts; it will not lean at an angle of 45° from the wind, and if on average good soil, will be a perfectly healthy and long-lived tree.

Now I do not propose that we should grow our trees in this way, but I do think that we might come a little nearer having perfect and healthy trees by elevating the art of tree pruning and by copying to a greater extent from nature. Dr. John A. Warder says, in one of his works, speaking of nature's pruning: "She prunes and trains magnificently, and gives us models for imitation."

As far as I have observed, in nature the healthiest trees are those on which the side branches have been allowed to grow. When a grove of trees grow up by an undisturbed effort of nature, they will effectually protect themselves against the sun and winds; those on the exposed sides remain shorter and retain their side branches, so that the branches of the tallest reach down to the next shorter, and these in turn to the next, and so on down to the shrubs, and these to the grass. Why is this so if it is not for the protection from the sun

and winds. If the short trees and shrubs are cut away the rest will soon decay, not on account of the wind alone, as we are usually told, but by the sun also; for I claim that the exposure to the sun has as much to do with it as the winds.

Where trees must be trimmed up high, I would allow the side branches to grow (although they might be kept short) until the top was large enough to shade the trunk, not from the summer sun only, but from the winter sun as well, which is probably the most injurious.—*Chas. D. Zimmerman before Am. Nurserymen's Association.*

DWARF APPLE TREES—FRENCH PARADISE STOCKS.

The problem, how to provide the possessors of limited grounds with an assortment of home-grown apples, adequate to their wants, and, at the same time, to avoid the necessity of introducing into such limited grounds trees whose natural growth will be sure soon to occasion a disproportion between them and the plat they occupy, as well as the desire of the nurseryman and pomologist to rapidly test the varieties with which they may have to do, and that without the necessity of devoting a large space to the purpose, have induced a resort, with the apple, to the process now so commonly applied to all our leading fruits—that of dwarfing, and at the same time hastening fructification by budding or grafting the varieties upon dissimilar stocks.

For the reason, as I imagine, that most buyers are in the habit of requiring large-sized trees, even when dwarfs are called for, it is the custom of nurserymen in general to use what is known as the Doucin stock for dwarfing apples, since the young trees so treated sooner reach the requisite size. On this stock, however, the vigor of the growth and the ultimate size of the tree are but slightly diminished; nor is the period of fructification very considerably hastened; while, as an inevitable consequence, the distance apart at which they should be planted is only proportionately diminished.

For the owners of village or city gardens, who of necessity can devote to fruit only a few rods of ground, in which a full-sized tree, or even an overgrown shrub, would appear out of keeping with the surroundings, and also for the trial grounds of the nurseryman and pomologist, in which quantity of fruit is of less consequence than early fructification, and in which also close planting insures a considerable diminution of the expense of cultivation, a little thought or experience suffices to allay the anxiety for large trees.

To supply the want of this large and increasing class of planters, resort is had to a yet more dwarfish variety of the apple—the French Paradise Apple—which usually attains a size very little larger than that of a well-grown currant or gooseberry bush, and which, for that reason, may be planted from five to six feet apart each way, and yet leave sufficient space to accommodate the ultimate growth of the tree.

The French Paradise stock seems to be at home in almost any soil adapted to fruit growing, although, in light or poor soils, it will, doubtless, sooner and more constantly demand the employment of fertilizers. Like all dwarfs, its roots extend but a limited distance, and hence, in any soil, they will the sooner exhaust the fertility within their reach, for this reason requiring constant, careful and thorough cultivation.

Unlike the pear dwarfed upon quince stocks, all varieties of the apple seem to be alike successful on the paradise stock; the chief ground of preference

being, that from natural habit of growth, some varieties are more easily kept in the desired form than others.

As a matter of convenience, apples are generally worked upon this stock by budding during the growing season, although they may, when desirable, be grafted without difficulty. The buds are forced into growth the following spring by cutting back the stock to just above the insertion of the bud, and the shoots, after one year's growth, are the following spring again cut back to the proper height for the commencement of the top, which should in no case exceed one or one and a half feet.

Dwarfs on Paradise stocks, when planted out, should always be set with the point of union at or very slightly below the surface, for the reason that, if planted higher than this, they are less sure to hold their position firmly, while they are likely to show an unsightly enlargement at their point of union, with an increased tendency to sprout from the stock above the ground. On the other hand, if planted so low as ultimately to cause roots to push from above the bud, the influence of the dwarf stock is overcome, and the tree assumes the habit and vigor of a standard. A well managed dwarf apple tree on this stock, will generally show fruit the third year from the bud, and if well cared for at suitable times, may be kept in proper shape with very little, if any, use of the knife. Of course, to do this, reference must be had to the normal habit of the variety. When the trees are permitted to assume their natural form, without an attempt to put them into a "straight-jacket" and mold them to a single model, the occasional lopping off or thinning out of a superfluous shoot, and the "pinching in" of the excessively vigorous or misplaced ones, will in the main suffice for this purpose, although, now and then, an open or straggling grower may require to have its shoots cut back in spring, to bring it into more compact condition, while the most upright or compact growers may need to be *spread*, either by thinning, or by staking and tying down the shoots, to open them sufficiently to the light.

It is believed that the dwarfing influence of this stock, while it diminishes the capacity of the tree for the production of fruit, tends rather to increase its size and lighten its color. How far this last may be true, I will not attempt to decide; but I feel quite safe in saying that, with the increased ability to produce the requisite variety of sorts upon a limited space, and within a comparatively short period, the use of the French Paradise stock offers to tradesmen, professional men, and city and village residents generally, the best possible means of securing an abundance, as well as a variety of fresh, seasonable fruit, such as no public market can be expected to supply.—*T. T. Lyon in Rural New Yorker.*

PEARS.

CHINESE SAND PEAR AND ITS SEEDLINGS.

The origin of the *Le Conte* pear is somewhat in obscurity; it is said to have been sent from a New York nursery some thirty years since by Major Le Conte, of Philadelphia, to some relative or friend of his in Liberty county, Georgia, labeled "Chinese Sand pear," but it is quite distinct from that variety, and is no doubt a hybrid between it and some garden pear, and has only been known

to the public during the past few years. Mr. H. H. Sanford of Thomasville, Georgia, kindly sent me specimens of this variety the last week of July of 1877 and 1878, being then ready for market. They were of good flavor, good size, ovate pyriform in shape, and of a pale yellow, or a delicate greenish-white color, flesh white with a peculiar flavor, being a mixture of the saccharine and vinous, having a slight astringency which may have been caused by not being fully ripe; they were not, however, equal in quality to many of our best garden varieties. Mr. Sanford informed me that the trees were hardy, very vigorous, early and very abundant bearers, and the fruit commands a high price in the market; the foliage is large and glossy, which gives the tree a handsome appearance.

From the different reports, the Le Conte has succeeded remarkably well in the South, being suited to the climate, hardy, free from blight, a very prolific bearer, and profitable. It has not fruited sufficiently at the north, to my knowledge, to give an opinion of its merits or value. The *Chinese Sand pear* and the *Japan pear* (the latter originating in New Jersey from seed brought from Japan) are hardy and free-growing trees in this locality; they bear early, and very abundantly, medium size and handsome fruit, not eatable out-of-hand, but make a good sauce, and also good for canning; the fruit will keep till midwinter or longer, with care; the foliage, especially of the Japan variety, is very large, glossy, and will make a beautiful lawn tree, and so far is free from the blight of our cultivated pears, and if it continues, will be an acquisition, that is, if the seedlings or hybrids will produce varieties equal to our best garden sorts. *Keiffer's Hybrid*, is another seedling of the Chinese Sand pear, which originated in the garden of Mr. Peter Keiffer, near Philadelphia, and which tree was growing near Beurre d' Anjou, Bartlett, Duchess, etc., the product being Keiffer's Hybrid, which is of very good quality, good size, deep yellow color, and orange yellow where exposed to the sun, ripening in October, and from what I have seen of it, it is a promising variety for market, as well as for family use.—*Charles Downing in New York Tribune.*

CRACKING OF THE PEAR.

The Michigan Farmer quotes a communication in the Scientific American to show the efficacy of iron in preventing the cracking of the pear. A tree of the Flemish Beauty pear, 25 years old and 25 feet high, standing in grass, had a circle dug four feet in diameter around the foot of the stem, treated with the sweepings of a blacksmith's shop, which contain quantities of iron filings and iron turnings. This tree bore several bushels of fair fruit, none of which was cracked or defective, and its whole appearance was vigorous and healthy. In the same neighborhood, and on similar soil, other trees of the Flemish Beauty not thus treated bore scabby and cracked pears, which dropped prematurely and proved of no value. The conclusion directly drawn was that the iron prevented the cracking, according to an old hypothesis which one has copied from another, without as full proof as would be required to establish it satisfactorily.

Let us look a moment at this cited example. Trees send off their roots in all directions to a distance fully equal to their height, and often much farther. The newer outer roots feed the tree more than the large woody roots near the trunk. A tree 25 feet high stands in the center of a circular net-work of its

roots at least 50 feet in diameter. Such a circle has more than a hundred and fifty times the surface of a circle only four feet in diameter. Is it probable that the very small quantity of iron rendered soluble in that small circle of large, hard-barked roots, controlled that great circle of fibres 50 feet in diameter, so as to change the small, black, cracked fruit, into "pears of great and unusual size," which we are informed took the first premium at the county fair?

Experiments have not yet established the position that iron is a specific for the cracking of the pear. We have had many trees of the White Doyenné, Flemish Beauty, and other sorts liable to crack, growing in a soil noted for its adaptness to pear culture. For many years the crops were smooth, fair, and excellent; then cracking began and grew worse, till the fruit became worthless. The iron theorists were promptly ready with their explanation,—“the roots had exhausted the iron from the soil!” But they did not take into consideration the fact that the roots were annually extending their circle into new and fresh soil where no roots had been before. Not much of the theory was left, when a few years afterwards the pears on all these trees ceased to crack, and became smooth and fair again, no application of iron having been made to them at any time, before or afterwards. The soil had naturally a very minute portion of iron, and in this soil the trees were planted, and they continued to grow with about equal vigor each year, bearing fine, fair fruit at one time, poor and scabby specimens at another, and smooth and excellent fruit again, without any change in treatment. We do not assert that iron never exerts a beneficial influence, but so far the proof appears to be quite insufficient, and the successful cases cited were probably accidental coincidences.—*Country Gentleman*.

PEACHES.

WHO ARE TO TEST THE NEW VARIETIES ?

President Lyon, after mentioning some of the new varieties and their origin, thus remarks :

It is a somewhat significant fact that among all those new varieties, not one is to be found hailing from the peach-growing regions. At least no name of a prominent market grower is associated with the originating or introducing of any one of them. In fact, so far as our own observation extends, very few if any of our commercial growers, who may be supposed to be more directly interested in the early determination of their actual value, either trouble themselves to inquire out their peculiarities, or to plant even a single tree with the purpose of testing their value, with reference to using the variety, should it be found profitable to do so. It is even true, so far as we are able to discover, that, as a rule, the least possible amount of pomological improvement may be expected to emanate from the commercial branch of this specialty—they usually contenting themselves with watching the self-sacrificing efforts of others, in readiness to take the best possible advantage of their demonstrations.

The amateur peach grower, therefore, who is, of all others, most likely to be

conscious of the desirableness of increased variety and earliness, for the supply of the home want, will be compelled to rely upon himself for the solution of the question, as to the value and adaptation to his wants, of these new candidates for the public favor. While it would be clearly impolitic for any ordinary grower to plant them, at present, upon an extended scale, little will be risked in the trial of a tree or two each, of some of the more promising varieties, while the fact of their success or failure will be quite likely to become useful, in the making of his future selections.

The claim of the increased earliness of a new variety is by no means to be implicitly relied upon, since years are not unfrequently needed, to determine with certainty what will finally prove to be the habit of a new sort in this particular, the original tree being liable to the influence of special circumstances, which may essentially affect its season of maturity or the character of its fruit.

Of the twenty or thirty new, very early peaches now before the public, and partially or wholly untested, it will be strange if some at least do not so far realize the anticipations of their introducers as to give us at least a few more days, at the opening of the season. It may be accepted as the rule, that these early sorts will fully maintain their quality in our climate and soils, the failures in this particular being usually of the late sorts, and attributable to the shortness of our season of warm weather.

PROTECTING PEACH TREES.

A plan for protecting peach trees has been invented and patented by the Murray Brothers, of Elm Grove, Missouri, which may commend itself to those who are not so fortunately situated for peach growing as our brethren of the Michigan lake shore. Their plan is by means of a simple contrivance to draw the top of the peach tree together in the form of a cone and then bale it with straw or canvass, which will completely protect it from severe storms or sudden changes of the weather. The blooming season can be held back in spring to keep out of the way of late frosts. It is said that two men will bale fifty trees per day.

THE PROFITS OF A PEACH ORCHARD—A SAMPLE OF MICHIGAN FARMING.

My fruit business, in connection with a system of general farming, has been very satisfactory.

My oldest peach orchard of 16 acres, set eight years ago, and which did so remarkably well in 1878, yielded, in 1879, 4,000 to 5,000 baskets of peaches, and netted about \$2,000. This orchard is set with peach, apple, and pear trees, the last two just coming into bearing. I had over 1,000 baskets of pears and about 50 barrels of apples, bringing the net income of the 16 acres to over \$2,500, and the aggregate net of this orchard for the last three years to over \$10,000. I shall not expect large returns from the peaches of this orchard in the future, as the apples and pears are occupying the space, and the "yellows" has also done considerable damage. I have, however, 20 acres, set 2, 3, and 4 years since, which are uninjured. I set all my orchards to apple, pear, and peach, so that when the peach trees fail my apple trees stand 40 feet apart,

with the pear standing in the centers of the squares formed by the apple trees.

I am much pleased with my fruit growing, but it is not my exclusive business. My farm consists of 400 acres, devoted to grain-growing and stock-raising. We have a fine section for winter wheat, and, with good cultivation, have an average of 25 bushels per acre. Sheep and cattle receive considerable attention; the former is my favorite stock, of which I have 250 head, and find them quite profitable in connection with my other farming.

The prospect for farmers looks brighter, and indeed for all classes of business. I have always believed that farming could be so conducted as to pay as well as the average of other occupations, but am convinced that many engage in it who have no love for it, and through the lack of this and other necessary qualifications fail to make it remunerative—the same as other business men fail who may not be adapted to the pursuits in which they engage.—*H. C. Sherwood in Post and Tribune.*

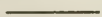


GRAPES.



THE WORDEN.

The Worden grape is one of those honest and modestly good things which slowly but surely make their own fame. Every year approves and confirms its merits, which have been little talked of, because the sort has been too much distributed to make it worth any particular grower's while to be at the expense of proclaiming it. It looks so much like a Concord in leaf and wood, and even in shape and color of berry, that many assert it to be nothing else, and it is probable that the Concord has been sold for it. But it is distinctly different and superior to the Concord in earliness, quality, and to some degree in size of berry, while fully equal to those two eminent excellencies of the Concord—great hardiness and abundant yield. It is equally tender skinned, and will probably keep no better, but has less of tough pulp, and is most enjoyable and satisfying in flavor. It is nearly two weeks earlier—a notable distinction. The Creveling has been our earliest best as to flavor, but we find it now positively superseded. The Worden will make an admirable bower grape, for shading paths or windows, on account of its hardiness in exposed situations, and its abundant foliage. All vines, so used, should be sulphured during the end of June and later; and syringed from below occasionally, if practicable, to keep the leaves fresh, bright, and clear. They are then the most beautiful and perfect screen possible.—*N. Y. Tribune.*



THE BRIGHTON GRAPE.

It is not often that new fruits not only stand the test of experience, but grow in popular favor. The Brighton grape seems one of these few good things. It ripens about the same time as the Hartford Prolific, and may therefore be classed with the early varieties.—*Gardener's Monthly.*

GRAPES IN PAPER BAGS.

We wish to add our testimony in favor of the value of paper-bag protection for grapes. We long since gave up all hope of growing any good table grapes in our climate on account of the universal destructiveness of the "rot." But seeing such positive statements by many reliable parties regarding the service of paper bags, we last summer applied the little bags to about half the clusters on the few vines (Concords) we had left. The enclosure was made when the grapes were about one quarter grown, the rotting having already commenced on some clusters. The result far exceeded our anticipations, every single grape not already attacked maturing perfectly inside the bags. On gathering the grapes in August we found that those particular berries which had been attacked with the fungus before bagging, had perished and dried up, but the disease had not spread in the least. The perfection of most of the clusters was delightful. Every bunch was fully colored, very high flavored, with untarnished bloom, and without blemish or defect of any kind. We were surprised and rejoiced.

As so many experimenters have obtained equally satisfying results, we have great faith that a practicable answer is at last found to the question of how to grow perfect grapes. These experiments seem to settle the controversy as to the source of the "rot." It does not come from the soil, from the root, or disease of the vine. It is a fungus disseminated through the atmosphere. The little manila bags, carefully pinned on, are impervious to air currents, hence the millions of fungus spores floating in the air cannot come in contact with the grapes, and no rot is generated.

But if any one prefers to think that the rot is caused by grape curculio, or any other small insect, or by sudden changes of temperature, or by too much rain, the protection given by the bags against either of these agencies is equally good. And then our sweet-singing but voracious friends, the birds, they are entirely shut out from their choicest feast! Well, we love the birds, and are willing to divide our dessert with them, and will leave out a few clusters for their benefit! But as the too enthusiastic birds have never been willing to divide fairly with us, having rarely left us a grape unharmed, of the few which had escaped the rot, we don't think they deserve a very generous share. The cost of bagging would be amply repaid by the security given against the attacks of the birds alone.

Now let us plant some grapes again, and take care of them, and bag them, and we have faith that our tables may be again laden with the most delightful fruit which man is ever permitted to enjoy.—*Parker Earle in Farmer and Fruit Grower.*

TRAINING AND PRUNING GRAPES.

I find many beautiful illustrations of various methods of performing the above operations, but I have never seen any one of them carried out to the perfection shown in the plates. In fact, I have rarely seen any one plan, as they appear in the books, attempted and persisted in for any length of time, except that recommended by Strong—a flat trellis about two and a half feet high and about as wide, allowing the vines to run over and hang down the sides as they please. This plan has with me worked very well, but it takes more work than

some others with the hoe, and less can be done with the cultivator. For this I set posts eight feet apart; saw them square at the top before setting, and set by a line, lay 2x6 inch blocks across the top, and fasten them with spikes; then nail 16-foot strips on the ends of these blocks; then nail, as may be needed, a half length of lath across.

I see that there is some controversy about the distance apart at which grape-vines should be planted, and I know two growers who, having planted in rows eight feet apart, the vines eight feet apart in the row, have eventually dug up every other vine in the row, and claim to have thereby increased the yield of fruit. That the increased yield should be the result of this process, if the vines are trained by the ordinary hap-hazard method, I can easily believe, without admitting any benefit from the increased room for the roots or vines.

The natural tendency of the vine is to keep increasing its length from year to year, bearing its fruit further and further from the stock, leaving at the base bare wood, constantly increasing in length. All pruning has for its main object the keeping of the vine within the prescribed bounds, and the occupying of the trellis with bearing instead of bare wood. Is it not possible that the thwarting of nature in this matter is one of the causes of rot and mildew so prevalent in places? I do not assert this as a fact, but I could give my reasons for believing it to be so.

To avoid this necessity for short pruning to prevent bare wood, I have hit upon the following plan, which I intend to put in practice at the next fall pruning with my three-year-old Concords and other rank-growing sorts. We will suppose a trellis of four bars or wires and two main canes. Tie these two canes to the lower bar 12 to 14 inches apart, then fasten the upper end of each to the third bar at an angle that just allows them to reach that point, both running parallel with each other in the same direction to form the angle, the acuteness of which will depend on the length of the canes. Allow these main canes to increase in length from year to year, two or more feet, giving them a more acute angle as their length increases; prune to short spurs; their length depending on your experience and judgment. By this process you will see that the bearing wood of one vine overlaps the bare wood of its neighbor, occupying all the trellis, and year by year approaching nearer a horizontal position.

I am aware that this plan is open to criticism, and that there may be found objections that I have not foreseen; but objections may be made to all the plans I have ever seen, and the most forcible objection is that to carry them out needs more care and close attention than one man in a hundred has the patience to give them. I shall follow the same plan with my flat trellises—train all the canes one way, the way prevailing wind blows as nearly as may be, and let the fruit-bearing part overlap the barren part, thus giving nature more of her own way.

I propose now to give some of the observations that have led me to this plan. The first specimen of grape pruning and training that I ever saw was attended to year after year by an old man, who had been much in foreign countries and who pruned close to a single cane trained horizontally some four feet high, giving it all the length that his limited area could afford. The varieties were Isabella and Catawba, his latitude Western New York, and his success satisfactory to him. In sight from where I now sit, I have a single old Concord vine trained on a trellis 12 feet long and 8 feet high. In the fall pruning the bearing wood is brought to any point where there is the most room for it, up, down or horizontally. The trellis abuts upon a fence, and some five years since I trained a rampant shoot upon the fence, giving it all its length. It has

been annually pruned to spurs of three to four buds, has always borne a monstrous crop, and has now about nine feet bare at its base, while 18 feet are loaded with fruit, and there is an extension of six feet, the growth of this year—33 feet in all.

I have other grape-vines bearing fruit 25 or more feet from their bases. They are on trellises six feet high and eight feet apart, with long canes thrown across them, and trained on cross-bars six to eight feet apart. The best fruit has always been overhead, but now, after five years' bearing, there is little on the side trellises, which is not the case with the vine first mentioned, no part of it being shaded.—*S. B. Peck in Rural New Yorker.*

GRAPES TO EAT AND TO KEEP.

Give to a capable naturalist the human jaw and teeth, and ask him what kind of food the animal required, and he would at once say the teeth indicated a mixed diet. Here are 32 teeth, 28 of them calculated by nature for the grinding of fruits, grains, nuts, and vegetables, and four for the tearing of flesh. Our health, and consequent happiness, depends very much upon our living in accordance with the laws indicated in our teeth.

Farmers well understand if they keep their horses on too concentrated diet that their stomachs get out of order, and they have to be turned out to grass to give them a chance to recuperate. The human animal suffers as much from the violation of nature's laws as any other. Our dyspeptic stomachs are constantly sounding the alarm from our eating too much meat and too little fruit. Our system is constantly calling for the elements contained in the outer coating of our fruits, grains, and roots. Twelve thousand dentists are employed in the United States hammering gold into our teeth, mainly because we live on an unnatural diet—too concentrated and refined food.

Our teeth are deteriorating, and in many families the number has been reduced to 28, because we have ceased to use them to grind our food, and nature refuses to keep up the supply where there is no demand.

As fruit is largely indicated as a requirement of our system, how shall it be eaten to best fulfill the demand?

It has been demonstrated by chemical analysis that a large portion of the bone-making material is found in the skins of our fruits, grains, and roots.

This brings us to the test of a good grape.

No grape should be considered good unless it can be eaten, pulp, seeds, and skins, with added relish.

At the grape cures in France the patients are required to eat whole grapes, pulp, seeds, and skins, to get the full benefit of the dietetic treatment.

At the inebriate cures all cases are considered hopeful where they can be induced to eat largely of fruit, the fruit overcoming the desire and destroying the taste for liquor.

It being conceded that grapes are desirable, how can we preserve them to prolong their usefulness?

The grapes should be picked when they are free from dampness, as the least moisture will cause them to mold. Great care should be taken not to break any of the grapes for the same reason. It is an advantage to place them at once in the box or jar in which they are to be kept, to avoid extra handling.

Coarse basswood turning chips or sawdust make a good absorbant of moisture, and they keep better packed in it than in any other way that I have tried ; but I have abandoned this process, on account of the difficulty of freeing the grapes from the dust that will adhere to them. I now prefer shallow boxes that will hold one course of stems, with soft paper over and under them. Closing the boxes tight, I pack them in the coolest place I can find, where they will not freeze, and leave them there until wanted for use. Packed in butter crocks, with paper between the courses, and buried in the ground, is a very good way when you have no ice-box or cool cellar to put them in. The main point is to keep them at a uniform cool temperature. When warm air passes over any cool substance the moisture is condensed on it, and the cool substance is said to sweat. For this reason no air should be admitted to a fruit house unless it is cooler than the fruit.

Varieties selected for keeping should have woody stems, and the grapes should have thick and firm skins, to hold the moisture. Some grapes that are otherwise good keepers drop from the stems so as to make them valueless for table or market. My choice for keeping at the present time is the Wilder, Agawam, Salem, and Clinton.

They should be packed as soon as in good eating condition, before they are dead ripe.

Strong growing vines should have ample room for roots as well as branches.

Experienced growers are now planting the more thrifty varieties sixteen feet each way, and some as far as twenty feet, and think they gain by it. I have a Clinton vine which has ample room, from which I picked last fall five hundred pounds of fruit.

Trim your vines in the fall as soon as your fruit is gathered, and lay the vines on the ground during the winter, with some sticks or sods to hold them down.

Do not handle or trim the vines while they are frozen, as they are liable to be broken and injured when in this condition. All trimming should be completed before the first of March.

The objects to be gained by trimming are to reduce the crop of grapes to the capacity of the vine, to concentrate the fruit in a few large bunches, rather than a great many small ones, to get new wood for bearing canes, and keep it in condition to be laid down in the winter or within the range of your trellis. All fruit comes from the shoots that grow the same year as the fruit, and the buds from the last year's growth of wood. Plant vines on good clay soil, that is well drained, cultivate thoroughly during the early part of the season.

Summer treatment consists in rubbing off all weak buds that start in the spring, leaving only the strong shoots to bear the fruit and in keeping them well tied to the trellis, otherwise the wind will break them down and destroy your calculations.

After the fruit is set, examine the vine and pinch off all the small and imperfect bunches, leaving but two bunches to the cane, and see that every bunch hangs free and clear from any incumbrance. If the vine is young or you want a few nice stems for any purpose, leave but one bunch on a cane.

No other summer pruning will be required, unless the vine grows so thick as to exclude the light and air from the fruit. In that case, remove some of the branches and laterals to let in the light.

Never take a leaf from a bearing cane. The fruit will not ripen perfectly if the leaves are destroyed. The sugar in the fruit is gathered by the leaves.

Sow plaster on the vines during the season, beginning when they are in blossom.

My last year's experience leads me to believe there is sulphur enough in the plaster to keep off the mildew. My vines look more healthy when it is used.

The kind of vines to plant depends very much upon the person who is to attend them. Some of our choicest varieties have tender leaves and are subject to mildew. Vines of this character should be in the hands of the most careful, observant, and painstaking. Such persons would prevent mildew. Others would try to cure it as soon as they observed it, and in most cases they would be too late, as the destruction of the fruit would have already been accomplished, and perhaps the vitality of the vine destroyed for all time. The coming vine will be as hardy as the Concord, and the fruit as delicate and high flavored as Allen's Hybrid.

The Concord will not come up to the standard for a good grape, as the skins are too offensive to be eaten, but it has so many good qualities that a list of desirable grapes would hardly be complete without it.

Here is a list that would please a large majority of persons: Concord, Delaware, Salem, Agawam, Wilder, and Eumelan. It would suit me better to change the first two to the Lady and Brighton. Other lists almost equally good could be made. Some of the best of these have faults which will cause them to be superseded at no distant day.

It is not best to be too sanguine about new kinds. Let those who are able to spare the means try the new kinds.

Too great a variety is not advisable, but no home should be without half a dozen vines.

The grape will give more satisfaction for the labor bestowed upon it than any fruit I am acquainted with. Raise good fruit, eat it as I have told you, pulps, seeds, and skins; be healthy and you will be happy.

Saginaw, Mich.

DR. L. C. WHITING.

BERRIES.

THE CUTHBERT RASPBERRY.

This remarkable berry, now becoming exceedingly popular, originated with the late Thomas Cuthbert, in New York city, fifteen years ago, or thereabouts, but has not been introduced to the public under its correct name until recently. Mr. Cuthbert appears to have made no further effort than to exhibit his great berry to a few friends, one of whom was Mr. Conover, of Asparagus fame, who, also spreading it in his neighborhood, gave it undesignedly the name of the "Conover," as it was nameless and must of necessity be known by some name.

Persistently the Cuthbert pushed its way over the State, demanding recognition of its merits. In some instances it was supposed to be the same as the Franconia or Naomi, and was sold extensively under these names. William

Parry, the keen observer, discovered its worth, and gave it the name of "Queen of the Market."

The Cuthbert is the most profitable red raspberry that I have seen. It is large, firm, handsome, and very rich in quality. It is perfectly hardy here, where the Kittatinny blackberry often winter-kills, but in some parts of the west and north my patrons write me that it will not stand the winters. In a very severe climate there is nothing that can be so safely recommended as the Turner, which I planted at an early day, wholly relying on Mr. P. C. Reynolds' impressions on seeing it in bearing, and I was not misled.—*C. A. Green in Rural Home.*

THE SNYDER BLACKBERRY.

The Snyder blackberry originated on or near the farm of Mr. Snyder, near La Porte, Ind., about the year 1851. Like the two above mentioned, it is a chance seedling of the *Rubus villosus*, or High blackberry of the fields and hillsides. We visited Mr. Roe's small fruit farm and nurseries about three weeks before the Snyder ripened its berries, and were both surprised and pleased at his field of this blackberry. The Snyder is wonderfully productive. The plants are very vigorous and stocky, and ripen their fruit quite early. The great desideratum among blackberries has been one that is perfectly hardy, and this want has been met in great part by the Snyder, which endures without any serious injury the extremes of temperature of the northern States. The great fault of the Snyder is the size of the berry, which is somewhat below the Kittatinny and Lawton. On this point Mr. Roe says, in his "Success with small Fruits": "On moist land, with judicious pruning, it could be made to approach them very nearly, however, while its earliness, hardiness, fine flavor, and ability to grow and yield abundantly almost anywhere, will tend to an increased popularity. For home use, size is not so important as flavor and certainty of a crop. It is also more nearly ripe when first black, than any other kind that I have seen; its thorns are straight and therefore less vicious. I find that it is growing steadily in popular favor; and when the Kittatinny is winter-killed this hardy new variety leaves little cause for repining."—*Rural New Yorker.*

THE IDEAL STRAWBERRY.

Rev. E. P. Roe says: "I doubt whether the ideal strawberry, that shall concentrate every excellence within its one juicy sphere, ever will be discovered or originated. We shall always have to make a choice, as we do in friends, for their several good qualities and their power to please our individual tastes. There is, however, one perfect strawberry in existence,—the strawberry of memory,—the little wildlings that we gathered, perhaps, with those over whom the wild strawberry is now growing. We will admit no fault in it, and, although we may no longer seek for this favorite fruit of our childhood, with the finest specimens of the garden before us, we sigh for those berries that grew on some far-off hill-side in years still farther away."

STRAWBERRY PLANTING AND CARE.

We extract the following from a lengthy article in the *World* by Secretary Williams of the New Jersey Horticultural Society:

It is always best to look up home testimony in regard to the success or failure of any fruit, if it is to be had. No one engaging in strawberry culture on the most limited scale should confine himself to a single variety. Three or four dozen plants, in as many varieties, costing about a dollar, delivered at your postoffice, are little enough to start with. It is far preferable to investing the same amount in one variety, for you not only cover a longer season by having early, medium, and late kinds, but some one or more may prove better adapted for your purposes than the others. We consider the spring generally the best season to set plants, but time is saved and sometimes good results obtained by setting in July or August. In the latter case plants should be procured near at hand or by express, the warm weather and growing condition of the plants rendering their transit by mail unsafe. Plants rooted in pots till they will hold the ball of earth together are perfectly safe, but if left too long they become pot-bound and are poor investments. I have found old broken berry baskets preferable to pots for this purpose, and the best way to utilize them. If not sufficiently open to allow the roots free egress they can be easily made so. Sunk in the ground to the surface, as soon as the young plant is rooted in them, they may be lifted entire and planted where wanted without removing them from the basket.

If confined to a small garden where the work must be done by hand we have generally set the plants in beds of three rows, fifteen to eighteen inches apart, and the plants one foot in the row, leaving a space—a path—between each bed from which to gather the fruit. If the runners are kept off, the plants will make large stools and produce larger fruit than if allowed to run at will. Where horse culture is available it is far preferable and cheaper. In this case the rows should be as long as possible, and two and one-half to five feet apart. I plant at the latter distance, allowing the young plants to root in rows covering a space about two feet wide. The cultivator is kept running to keep the ground free of weeds, and the young plants set in evenly over the space designated.

I have never yet found any fertilizer preferable to well rotted barn-yard manure, but if the ground is made rich for preceding crops it is all the better. I have experimented with commercial fertilizers, but so far they are only experiments.

What should be done with beds now that the season is over? Turn them under and put some other crop on the ground, or fertilize and renew with young plants on the same ground. I find it cheaper and less labor to set and keep clean a new bed than to clean out an old one. New beds should be set every spring on purpose to supply young plants for fall or spring setting. Old beds are a poor dependence for plants where vigor and healthfulness are considered.

STRAWBERRIES FOR DISTANT MARKETS.

The above article called to mind another, written for the *Farmer and Fruit Grower* by Secretary Galusha of the Illinois Horticultural Society, on a kindred topic, from which we extract as follows:

Since it is often asserted that there is no strawberry to take the place of the famous Wilson for long shipment, and since it is a fact that there are at least a dozen varieties, which, when on the market at the same time as Wilson, will bring from one-third to one-half more, it becomes a serious question with those growers who live at a long distance from market, and especially those of southern Illinois whose lands are peculiarly adapted to fruit growing, whether there is any variety of strawberry which can be shipped 300 to 400 miles and bring a first-class price after having been twenty-four hours in market. Right here is the place for another important consideration, viz.: that the time has already come when commission men in Chicago must abandon the hope of handling all the fruit which Illinois and western Michigan produces. Growers must and will ship directly to the towns where the fruit is to be consumed, thus saving expenses of re-shipments and commissions in Chicago, and, more than all, losses caused by delays and longer journeys. This plan has been adopted by very many growers already with success and must very soon become general in marketing perishable fruits. This fact taken in connection with the consideration that the Wilson can no longer compete with better sorts in the markets, leads me to say that there are several varieties which may be substituted to a decided advantage to the grower. It is quite probable that most, if not all of these will require more care in growing, and the occasional application of manures to the soil.

The most prominent among these sorts at present is, perhaps, Capt. Jack, a seedling of the Wilson, inheriting the prolific habit of its parent in an increased degree, equally as hardy in vine, fruit larger, of decidedly better quality, and bearing transportation almost if not quite as well as the Wilson.

The Continental is the firmest berry in more than thirty varieties on my grounds, is large, sweet, and must command a high price in market wherever known. The vines are as prolific as Wilson.

Prouty is more productive than Wilson, and berries of about same size when kept in rows on rich ground. The berries are beautiful, rich and firm enough to ship well from Cairo to Chicago.

Sharpless and Miner—"Miner's Great Prolific" are two sorts of recent introduction, of about equal merit in every respect; larger than either of the previously named sorts, vines hardy and very productive, and the fruit will carry well to a quite distant market. These berries, exposed for sale in almost any large town side by side with Wilson, would be taken in preference to it at nearly double the price.

I am very favorably impressed with Centennial Favorite and Glendale as shipping varieties, but dare not give a decided opinion until after another season's fruitage.

HOW TO GROW GOOD STRAWBERRIES.

The following excellent paper is from the March proceedings of the Ingham County Horticultural Society, and was written by Ezra Jones of Lansing:

To grow poor fruit is not difficult. It requires neither thought nor skill nor even much physical labor.

Of all sorts of fruit, whether the large or small, there are some varieties that will yield moderate crops under neglect. The shiftless, lazy man, who goes

slipshod through life, who never does anything thoroughly, unless it be to eat and sleep, who will not more than half prepare his ground or half take care of it after the plants are set, may, from the midst of weeds and grass, get a fair crop of Green Prolific or Wilson strawberries, or even of that much over-praised new variety, the Crescent Seedling. But they will not be first-class berries of even these comparatively poor varieties. Many persons, however, will be satisfied with them. Persons who will discriminate readily between good and poor apples, or any other sort of fruit, say strawberries are strawberries, and they can't see much difference in them except in size and shape. It seems almost incredible that the sour Wilson should seem the same as the sweet Seth Boyden, the flavorless Green Prolific as the rich flavored Duncan, or the dull acid of the Crescent as the spicy and delightful flavor of the President Wilder, Essex Beauty, Centennial Favorite, Great American, and a host of others.

But these splendid high-flavored berries cannot be produced without labor and care and skill. They demand a deep, rich, and thoroughly prepared soil. I am not unaware that the opinion has prevailed somewhat extensively in the past and is still entertained by a few growers, that in a very rich soil all varieties will run too much to vines; that the vines will grow large and rampant but the fruit small in size and quantity. Many years ago a friend of mine told me he had been trying for several years to raise strawberries in his garden but had failed until that year, and that year he was getting a large crop. He accounted for it by saying that formerly he had them on his best soil, but that year they were on a yellow clay that did not seem to have much richness in it. The probability is he had them where a stump or log heap had been burned and that the ground was full of ashes, one of the very best fertilizers for strawberries, and that in previous years he used raw manures.

I certainly never have been able to make a soil too rich with properly prepared manure for the finer varieties of this fruit, or to bestow upon them too much care in the way of weeding and cultivating. In fact I can get no satisfactory returns from them, and have never found anyone that could, from a poor or poorly prepared soil, with careless after treatment.

It seems to me that small fruit nurserymen are too much in the habit of representing the growing of strawberries and other small fruits as requiring but little time and labor. The farmer or the laborer may thereby be induced to make a purchase of plants—and he will always want the best—but he will be likely to feel deceived and disappointed, when he finds they will not produce among weeds.

Three years ago a lady in the city came to me for plants. She did not know what varieties she wanted, but said she wanted the best, and her husband told her to have me select them and he would hold me responsible for their quality, etc. I took the responsibility on condition that they should be cared for as I directed. The next year, at the time of fruiting, she met me at the store where my berries were sold, and inquired for the name of one of the varieties she had. She said the fruit was very large and very sweet, that neither she nor her neighbors ever saw any berries equal to them. They had good care. A gentleman who is a large farmer, and who I knew was extremely busy in tending to the work of his farm, came for plants, said he wanted those as good as any I had. I told him what was the best for one was not always the best for another, that those that produced the largest and finest berries would require the best soil and care, that weeds and grass *must* be kept out and the runners ought to be cut off. He took the same varieties that the lady had.

When the fruit season arrived I inquired about them. "Well," he said, "I don't get a great many berries." I asked if he had cultivated them and kept out the weeds, etc. "Well, no," he replied, "they are pretty weedy." Yet he evidently felt disappointed that there was not more and larger fruit.

I have mentioned these two cases to prove my statement that the varieties that yield berries of superior size and flavor, under suitable treatment, will not respond to neglect, and that even when the neglecter has no reason to expect different results from those he gets, he will feel disappointed.

I have already indirectly indicated some of the finer varieties and hinted at the way they should be grown. I wish now to state what fertilizers I have found, by actual trial, to be most suitable, and what is meant by thorough preparation and cultivation. It has become customary when the question is asked, what is the best fertilizer for any particular crop, to answer, nothing is better than well-rotted stable manure. As far as the strawberry is concerned, I dissent from this answer. Not that it is not a good fertilizer for the strawberry, but that it is not the best. The strawberry, both fruit and plant, is composed largely of potash and phosphoric acid: these and nitrogen are what are required to be supplied. All its other elements are found in sufficient quantities in most soils. Its demands in this direction are best met, so far as my experience goes, by wood ashes and a compost made of equal parts of hen manure and common field soil. This compost should be worked over until fine enough to be taken in a basket and scattered by hand. If commenced to be made this spring and thoroughly worked during the summer it will be fit for use in the fall or any time thereafter. I use about ten barrels of this and six barrels of unleached wood ashes to an acre.

Now as to the preparation of the ground. If it is clayey with a clay subsoil, it ought to be underdrained and subsoiled in order to provide, as far as possible, against drought that so frequently comes in fruiting time. But if the facilities for doing this are wanting, then the top soil must be plowed or spaded to its full depth, being careful not to bring the subsoil to the surface. On this should be spread half the compost and half the ashes intended for the whole plat, and well worked in with the cultivator and the drag, or the hoe and the rake. Then it should be re-plowed, the balance of the manure put on, and recultivated and dragged, always bearing in mind that the soil cannot be too thoroughly pulverized or the fertilizer too thoroughly incorporated therewith. The surface should then be made smooth by either a roller or a plank-drag.

The plat is now ready for the plants. These may be set according to one's taste and facilities for cultivating. If in a small garden, where hand cultivation must be used, I should set them 12 by 16 inches, in beds four feet wide; where a horse could be used, one foot by three, being careful to get my rows as nearly straight as possible, so that in the beginning the cultivator may be run close to the plants. Some of the better varieties—such as Jucunda, President Wilder, and Triomphe de Gand—must be kept in hills in order to get profitable returns. If you want large and first quality berries, all of the high class varieties should be so kept. That is they should not be allowed to form new plants. To prevent this the runners will need to be cut off about once in 10 or 12 days during the growing season. If this is done the plants will form large stools that will meet each other in the rows. A very good implement for cutting off the runners is a knife shaped something like a kitchen chopping-knife fastened in a long handle. With this you can walk rapidly down the rows, cutting off the runners without stopping.

The plants should be cultivated about once a week during the entire season of growth, and such weeds as are not reached by the cultivator must be got out with the hoe or hand. Every year as long as the plat is permitted to remain it should be top dressed with the same fertilizer in about the same amount, half to be applied at the last cultivation before blossoming, and half at the first after fruiting.

As soon as the ground is frozen in the fall the plants should be covered with clean straw, just enough, and no more, to hide them from view. The object of this mulch is two-fold, viz.: to keep the plants from the blighting influence of the hot sun when they are frozen, and to keep them from being thrown out of the ground by the frequent freezing and thawing. The past winter and present spring furnish a good illustration of the necessity for such a mulch. As soon in the spring as freezing is over, this mulch may be removed, the ground cultivated, and the mulch replaced in the rows, or the mulch may be pushed away from the plants and left until after fruiting. Good cultivators differ in opinion as to which of these ways is best. But the last cultivation should be done and the mulch replaced before blossoming. The object of the mulch at the time of fruiting is to keep the fruit clean and the ground moist. It is hardly possible to get too much moisture in a well drained soil at that time. If at any time plants of any variety are wanted for the purpose of adding to or renewing the plantation, each parent plant may be allowed to produce three new ones. In this case, the new plant as soon as well rooted should be severed from the parent.

These fine strawberries, when grown as I have described, are larger and richer in flavor, are more easily gathered, look better in the boxes and on the table, and taste much better, because you taste them with the eye as well as with the palate. Even the Wilson, when grown in this manner and allowed to get fully ripe before it is picked, is very different from and superior to the half-grown, half-ripened sour Wilson usually found in the market.

To obtain the largest success as a grower of this fruit a person must have a love for the business. He must not go to his work as a slave under the lash of a task master; he must be deeply interested in it,—an enthusiast in it, if you please. Then his labor and care, even if wearying, as they surely will be, will be a pleasure, and he will not yield to the difficulties, discouragements, and disappointments that will inevitably meet him at times. He must feel that this employment is honorable, not menial; that it is as dignified as any to which man devotes his time and energies.

The fine, large, well-grown strawberry is the most delicious fruit in the gardens of earth. Beautiful in its rich, green foliage, beautiful in its pure white blossoms, superbly beautiful in its own crimson maturity, it seems to me to have a memory and a voice. It tells me of its former home in paradise, where every breeze was laden with the fragrance of fruit and flower, and man in his purity walked and talked with angels, while they ate of the fruit, and were satisfied and happy. It seems also to have a voice of prophecy; that tells me of a paradise to be regained; that at the bidding of Him who is the resurrection and the life, man shall come forth, purified from the grossness of earth and the pollutions of sin, and live again with angels in the gardens of immortality, and again gather fruits from the banks of the river of life.

BLUEBERRY IN THE GARDEN.

A correspondent of the Fruit Recorder says he has grown the high blueberry in Maine for forty years profitably, and considers it one of the most promising market fruits. The fruit is larger, finer, and richer than the low blueberry. The bushes grow thrifty, throwing up strong shoots ten or twelve feet high in a few years. It does not require high culture nor very rich ground. It wants plenty of sun, and succeeds best on high, dry soil. I have always transplanted my bushes from the wild state, but presume they could be profitably grown in the nursery.

PLANTING AND TRANSPLANTING.

TRANSPLANTING TREES.

I planted a lot of seedling spruces and balsams ten years ago in a very stiff or heavy clay soil. In three or four years I transplanted half of them, which operation root-pruned both those that were removed and those that remained. The job was well done, and not a tree lost. Fibrous roots were made, and when I am setting them a ball of earth envelops the roots and I never lose any trees. One year ago I took up a nice spruce, six or seven feet high, and left it standing on the sod with nothing to protect it but the ball of earth, and it has remained there ever since, and is still sound and good, although we had the worst drought I ever saw. We can put one of those trees in a wagon and drive twenty miles; the tree will stand straight up and be sure to grow. But you can't do this with trees grown in the sand; the dirt will all fall off and the roots get dry and have to be kept moist, especially those of large trees. I have successfully moved trees twelve feet high with a ball of earth that would weigh 200 to 300 pounds. Some people, in giving directions for transplanting, say, dig the hole a little deeper than the tree stood in the nursery. But this won't do in a heavy clay soil, unless the ground is well drained, because the hole will fill up with water and drown the tree; even a fish may be drowned. But in removing trees from a clay soil to a sandy soil the advice is good, because it is impossible to drown a tree in any well-drained soil. Sometimes, in planting, I set the tree on the surface of the ground and fetch soil to cover the roots, and I very seldom lose a tree.—*E. A. Roby, Kent Co., Mich., in N. Y. Tribune.*

WHAT KILLS FRUIT TREES.

Some time ago Josiah Hoopes, in an address before the Pennsylvania Fruit Growers' Association, made the following excellent remarks on planting fruit trees: "Deep planting is an error; to plant a tree rather shallower than it formerly stood is really the right way, whilst many plant a tree as they would a post. Roots are of two kinds—the young and tender rootlets, composed en-

tirely of cells, the feeders of the tree, always found near the surface getting air and moisture, and roots of over one year old, which serve only as supporters of the tree and as conductors of its food. Hence the injury that ensues when the delicate rootlets are so deeply buried in earth. Placing fresh or green manure in contact with the young roots is, he tells us, another great error. The place to put manure is on the surface, where the elements disintegrate, dissolve and carry it downwards. Numerous forms of fungi are generated and reproduced by the application of such manures directly to the roots, and they immediately attack the tree. It is very well to enrich the soil at transplanting the tree, but the manure, if to be in contact with or very near the roots, should be thoroughly decomposed."—*Rural Home*.

HEADING BACK TRANSPLANTED TREES.

The practice of cutting and slashing trees that are transplanted is only an excuse for tearing the trees out of the ground and mutilating the roots instead of carefully removing them. But we do not agree with the opinion that all cutting should be avoided. The error is in not doing the work right. When a tree is dug from the ground where it has grown, the roots should be so carefully preserved that no large limb or branch need be cut, unless it be to give the top a good shape, and even this may be deferred to the second year. But it is usually very important to reduce the mass of foliage which the trees must support. This is neatly and efficiently done by cutting back all the previous year's growth, one-half, three-fourths, or nine-tenths, according to the loss of roots. In this way there is no mutilation, or reduction of the size of the head, and all may be accomplished that is required. The mistake must never be made by performing the cutting back after the buds are expanded, which will do more harm than good.—*Country Gentleman*.

PRUNING.

VARNISH FOR WOUNDS.

Any limb as large or larger than one's finger should, after being cut off, be painted with some kind of preparation to shut out the air and prevent rain from getting into the body. Gum shellac and alcohol is easily prepared and put in, and when once hardened is not subject to the effects of heat. It hardens very soon after application, and can be used in hot or cold weather—is always ready for use. Prepare in a wide-mouthed bottle or jar and apply with a brush. Keep well corked when not in use to prevent evaporation.—*Record*.

SEASON FOR PRUNING.

A western fruit grower says that he cut off a limb an inch in diameter from an apple tree in each month of the year. At the end of five years, when they were all healed over, they were opened, and those found to have decayed the least were those cut in February and March, or just before the swelling of the buds, while those cut in June and July, or during the growing season, had decayed the most; by this it would appear that the old way of pruning in early spring, before the sap begins to flow, was the best.

PRUNING FOR WOOD AND FRUIT.

Mr. William Saunders of Washington, D. C., thinks the rule to prune in summer for fruit, and in winter for wood, needs a good deal of qualifying. He admits that the methods employed to produce fruitfulness in a tree, by reducing the vigor of the tree by shortening in, dwarfing, root-pruning, tying down branches, will all tend in the direction of fruitfulness, but it is to the practical application of the rule for summer pruning that he criticises. He says: "If the shoots of a growing apple tree are shortened in one-third, say towards the close of June, the remaining buds instead of developing into fruit buds, will in ordinary seasons, start out new growths of wood. If this pruning is delayed until August, and is followed by dry weather, the probabilities are in favor of the formation of fruit spurs, but if the fall should prove wet and warm, the result will be the same as in the June pruning, and the new shoots will go into winter in the worst possible shape, a green succulent growth with no ripeness. The process then, to say the least, is somewhat dangerous in application. But if the cause of barrenness be impaired vitality instead of over luxuriance, summer pruning would speedily destroy the tree."

As to pruning in winter for wood, he doubts if this method will produce in the aggregate any more growth, but by confining the growth to fewer buds, greater length is secured, and there is no doubt but winter pruning will by this means impart a vigor to weak trees to be secured in no other way. He gives a more precise maxim as follows: "Summer pruning tends to weaken the growth of a plant, while winter pruning tends to increased vigor in the branches, and all pruning is of more or less injury to the vitality of plants."

FERTILIZERS.

VALUE OF SWAMP MUCK.

Muck is generally praised without "ifs" or "buts," and the following view by Col. F. D. Curtis may give a hint that will set somebody to thinking:

The mistake about muck is that everything found in wet places is called muck. Black sand or dirt is carted out as muck, but is worthless, except to

lighten clay land. Pond mud is called muck because it is black, but as a rule it will not pay for handling. Peat is supposed to be muck, but makes a very poor manure applied directly to a crop. All muck is sour and injurious to the land until it is changed by a winter's freezing or the rays of the sun. If one has a muck bed it will pay to work at it in winter when there is nothing else to do, and in summer convert it into ashes for a top dressing. It will also pay when the teams are otherwise idle to haul muck to the barnyard, if it can be got at handy, and the price of the labor is not very high; 25 cents per load delivered on the ground, is all the expense it will bear as a maximum value, and it should not be more than half that as muck averages.

USES OF SOOT IN THE GARDEN.

Soot is valuable for the ammonia which it contains, and also for its power of reabsorbing ammonia. The creosote it contains is valuable as an insect destroyer and as a fertilizer of all garden crops. If the soil is dry a little common household salt may be mixed with soot. Lime and soot should never be mixed together; lime destroys the ammonia. Soot that has been steeped in water for two or three days is as good a fertilizer as horse hoof parings for house plants, and increases the vividness of the bloom of flowers in the open air. Soot and salt in connection with compost—one quart of salt to six quarts of soot—is an excellent fertilizer for asparagus, onions, cabbages, etc. Two bushels of compost make a heavy dressing for each square rod of ground, to be worked in the surface of the soil.—*Gardening Illustrated*.

USING BONES.

There is no better manure for berries, trees and vines than bones, if they can be utilized. The papers are teeming with methods to reduce them, but the simplest and best method for fruit growers is to follow Dr. Nichols' method, published so many years ago: "Take 100 pounds of bones broken up into small fragments; pack them into a tight cask or box with 100 pounds of good wood ashes. Mix with the ashes before packing, 25 pounds of slacked lime 12 pounds of sal soda, powdered fine. It will require about 20 gallons of water to saturate the mass, and more may be added from time to time to maintain the moisture. In two or three weeks the bones will be so soft that they may be turned out upon the floor and mixed with two bushels of good soil, and after the mass is dry it will be ready for use."

SCIENCE AND SENSE ABOUT MANURE.

Dissolve common salt in water, sprinkle the same over your manure heap, and the volatile parts of the ammonia will become fixed salts, from their having united with the muriatic acid of the common salt, and the soda thus liberated from the salt will quickly absorb carbonic acid, forming carbonate of soda; thus you will retain with your manure the ammonia that would otherwise fly

away, and you have a new and important agent introduced, viz: the carbonate of soda, which is a powerful solvent of vegetable fibre.—*Farmer and Dairyman.*

STORING, MARKETING, AND PRESERVING.

STORING APPLES.

Two years ago this spring I advertised for 500 barrels of apples, and purchased nearly that number, noting carefully the results of various methods of storing. Those stored in damp, dark, cellars were brighter, firmer, and less decayed. In one cellar in Woodstock, eighty barrels were stored above water three inches deep in the cellar bottom, which emanated from a spring. The barrels were not headed up, but stood upon stones and timbers just above the water; they were Russets, Greenings, Baldwins, and English Beauties. In some of the barrels there was not a specked apple; they were the best of all I bought; and of the others, those in damp cellars proved the best.—*Mass. Ploughman.*

Dr. T. H. Hoskins, Newport, Vt., refers in the 'The Rural New Yorker to the frequently observed fact of stray apples keeping well all winter on the ground covered with leaves under the trees, and adds these suggestive remarks:

A friend of mine living in Montreal says that seeing some very fine Fameuses exposed for sale in that city, he inquired how they were kept. He learned that they were part of a cargo of a canal boat which had sunk in the canal and was frozen before it could be raised. When this was effected in the spring, it was found that the cargo of apples, which would not have kept much longer than January in the air, had been preserved perfectly in the water. An old custom of burying apples in the ground the same as roots for winter storage also demonstrates that moisture in contact with apples does not necessarily cause rotting. In Russia I understand that apples are preserved in tight barrels with water, in the way practiced in this country with cranberries. On the other hand apples keep perfectly in dry cellars, as many fruit growers can testify.

What then is the essential requisite for the safe winter keeping of this fruit? Simply, I believe, the preservation of a low uniform temperature as near the freezing point of water as possible. This can be maintained in dry cellars, but much more easily and perfectly, I think, in wet ones. The presence of water has a controlling power over the variations of temperature near the freezing point, as all know who have had to keep water in a cold cellar to keep it from freezing. The moisture does no harm to the apples. It may even be a direct benefit in preventing evaporation from and consequent withering of the apples, though this evaporation is very slight at the low temperature necessary in fruit cellars for success in keeping apples over until spring.

In Canada apples are rarely stored for keeping in house cellars. A special cellar is made, deep, with thick stone walls laid in mortar. These walls rise above the surface only about ten inches, to allow of small windows for ventilation and light. There is a double floor above filled in with moss or sawdust. This floor is covered by a roof-like attic, and the apples are there kept until the approach of severe frosts, when they are sorted, barreled, and lowered into the cellar through a trap-door, which is then closed and packed in the same way as the floor. At times during the winter when the weather is not freezing this cellar is opened and the fruit removed for sale. When properly made and managed there is little or no loss in the way of storing winter apples.

ANOTHER VIEW OF STORING.

A correspondent of the N. Y. Tribune writes as follows:

Apples never sweat, but moisture condenses on them as dew upon grass. Fruit should be carefully gathered as soon as ripe, when the weather is dry and warm; should never be handled when wet, and must not be bruised nor chafed in the least. The natural waxy secretion found on fruit is a protection against the effects of moisture and air; when the skin is deprived of this protection or is broken by pressure, or even by a puncture of a pin (made in labeling fruit at our fairs, as is often done), the oxygen of the air will gain access to the juices of the fruit, and fermentation and decay will result. Gathered as above described and carried directly to the cellar when the fruit is warm and dry, and packed in barrels or bins, the atmosphere being cool, the vapor in it will not condense and no dew will be seen on the fruit, as will be the case when the apples are cooler than the cellar air. Forty years ago or more I thus stored eight barrels of Roxbury Russets in my cellar as soon as gathered, and laid the barrels on the bilge, and when opened the 8th of July not an apple was specked, while the remainder, gathered in an ordinary way, barreled and stored in the barn (as was then said "to sweat"), during the changes of heat in November till cold weather, and then stored in cellar, rotted badly by the middle of May.

FRUIT CURING.

The California Mountain Messenger reports an interesting experiment in fruit curing lately made at a Placerville foundry. About a peck of sliced apples were placed in a sieve and subjected to a cold air blast for three and a half hours in the cupola furnace of the foundry, and the fruit is reported to have been completely and beautifully cured by the treatment, remaining soft and without the slightest discoloration. The cured fruit showed none of the harsh, stiff dryness which results from hot curing, the cold blast completely freeing the fruit from excess of moisture, with no possibility of burning or shriveling it. The Messenger says: "Compared with our sun drying, it effects a great saving of expense, attention, and risk. Anybody who can command or devise a strong blast of cold air can dry fruit in a superior—we might say perfect—manner, without being dependent on the weather and waiting on the slow pro-

cess of sun drying, and without the most expensive resort to fuel and the risk of overheating.”

PACKING APPLES FOR DISTANT MARKETS.

Many believe that some packing material should be used in the barrels to keep apples from bruising each other; but we have never known this to be necessary when the apples were sound, and properly barreled. After the apples are in, they should be subjected to a pressure by the lid, to the extent of even pressing some of the fruit into each other. In good air-tight barrels, they will not move or bruise each other. It is only after the air gets to the bruise by the pressed-in apple, that decay follows; while the two apples are pressed together they will not rot.—*Gardener's Monthly*.

FRUIT AND SUGAR.

When fruit does harm it is because it is eaten at improper times, in improper quantities, or before it is fully ripened and fit to be taken into the stomach. Unripe fruit of any kind is indigestible, but with the present facilities for a supply of one or more kinds of choice ripe fruits nearly the year round, there is little need for using that which is unwholesome. Grapes and strawberries are two of the most healthful fruits that can be grown. These fruits, eaten liberally of during their seasons, with other sorts that ripen between the seasons of these two, will be found more potent to cure diseases of the bowels and digestive organs, unless of too long standing to be relieved by any remedy, than drugs and medicines. The main difficulty is we do not eat enough of fruit, and then the imperious claims of too often perverted tastes lead us to destroy its finer qualities with sugar. We need the medicinal qualities of the pure fruit acids in our systems, taken from nature's own laboratory, and given us as one of the best gifts of providence. Let us accept them as such.—*Michigan Homestead*.

BIRDS AND MOLES.

HOW THE ENGLISH SPARROW LOVES INSECTS.

With much trouble we succeeded in driving the sparrow from our cornice where they had made their roosts. They betook themselves to the thick shade of a box elder tree that stood near by, and found a comfortable summer roost. Anon, the tent-caterpillars came and “jumped their claim.” But the spar-

rows did not resent it, and the two occupants dwelt together in unity. The result is, the insects have stripped the tree of its leaves, and the poor sparrows are without a shelter, and when it rains they make a pitiful twittering, but they meekly endure their wrongs. O, the love of the sparrow; the base ingratitude of the caterpillar.—*Indiana Farmer*.

THE ROBIN.

The American Agriculturist puts down the robin of this country as one of the pests of the garden. Their first depredations were on the strawberry beds, where they devoured fine and luscious specimens of the Monarch of the West, and mutilated more than they ate. Next, the green peas were scooped out of the pods; then they devoured pecks of the early cherries; the currants, which the owner had carefully saved by applying hellebore, were next plundered by all the robins in the neighborhood; then the early pears were pecked and punctured, and the Delaware and other grapes fed on till frost. The writer then says: "We hardly know the secret of his popularity; he is not more beautiful than other birds, and has no sweeter song." We can inform him: it comes from the use of another bird's trade-mark—the name of the English robin, a very different bird, closely allied to our blue-bird, and a really amiable little fellow, whose fame has been spread by old legends and nursery songs; while the American robin is much like the English blackbird and belongs to the same genus.—*Country Gentleman*.

ENGLISH SPARROW AND SMALL FRUITS.

This lively little fellow has elicited considerable discussion for two or three years past. His family increases so rapidly that most of our large towns and cities are already quartering his progeny, likewise his "cousins, and his uncles and his aunts," and their descendants in large numbers.

In regard to whether these birds are a benefit or an injury, the weight of argument thus far has gone to prove that they are not a desirable acquisition. They are exceedingly pugnacious, driving away almost every other bird that comes within their reach, or attempts to build its nest in their vicinity. But the most serious count in the indictment against them is the injury they do to fruit; not so much to the fruit itself, but to the bushes and trees during the winter. A case in point has recently come under observation. Mr. J. Newhall of Toronto, Canada, has hitherto been an advocate of the English sparrows, and frequently defended them in the public prints, but he has had an experience with them the past winter which has cooled his admiration. He has a red currant patch to which the sparrow paid great attention. Curiosity led him to investigate the matter, when, to his surprise and consternation, he found every bush entirely denuded of every fruit-bud as clean as if it had been rubbed down with leather-gloved hands. Not a bud left! Further investigation showed that his Glass' seedling plums were nearly stripped of every bud also, and his Mayduke cherries were considerably damaged. Mr. Newhall now thinks that if these sparrows increase in the same ratio for the next three years as they have in the past three, it will be useless to attempt to grow small fruits

in Toronto. He thinks also that this matter is a fit subject for the consideration of Fruit Growers' Associations. His suggestion is proper and timely, for these sparrows multiply prodigiously, and are spreading rapidly throughout the country. Forewarned is oftentimes forearmed.—*Prairie Farmer*.

SPARE THE SAPSUCKER.

The poor "sapsucker"—"Nuthatch" of the books—is again attacked in some quarters on the score that it really does injury to fruit trees by boring holes in the trunks and sucking the sap, and hence the life of the tree! We pity the shortsightedness of those who thus expose themselves to public ridicule. They offer no proof of a nature that a justice of the peace would receive in a case of assault and battery; they jump at conclusions without investigation—and in questions of this kind everything depends upon investigation. The harmless "sapsucker," like several other birds, has to bear a great deal of nonsensical abuse; and while it presents no bill for the myriads of worms and insects it destroys, it ought to be remunerated on every side by a good word for the valuable service it performs and a stern denial of the sins charged against it.—*Germantown Telegraph*.

AN ENGLISHMAN'S VIEW OF THE SPARROW.

A correspondent of the Gardeners' Chronicle thus relieves himself on the sparrow question: "Would that the 'hot blasts of indignation' had the power to rid the gardeners of such winged vermin as sparrows, bullfinches, chaffinches, linnets, and bluecaps. I can indorse all that can be said against that worst of all winged vermin, the unspeakable sparrow. The unusual severity of last winter did not diminish the number of sparrows in this district, for there are countless multitudes. Eat caterpillars, indeed! Any one looking at the gooseberry bushes in this district would become an unbeliever in such works of charity by a sparrow. They are content only with the best of corn and dainties from the kitchen garden, then scent their bills with sweet-scented flowers. Quite aristocratic, of course; more especially now that parochial sparrow clubs are extinct."

THE PREY CATCHERS.

Mr. A. S. Fuller, writing on this subject in *The American Entomologist*, expresses these sensible views:

It is no wonder that the fields are overrun with mice, and hundreds of thousands of fruit trees are annually girdled and destroyed by these pests, whose natural enemies have been driven away or killed. Better keep the chickens and turkeys in a secure lath-covered yard until they are too large to be caught by hawks than to kill off all the birds of prey. The crow or blackbird, although not classed among the birds of prey by ornithologists, are considered as such by our farmers, and pursued with as much vindictiveness, because both are sometimes caught stealing a few grains of corn, and the former is known

to be fond of eggs, and is not at all particular in regard to their kind, whether it be those of the duck, hen, or those of some wild bird in the field or forest. But with all their faults, there can be little doubt that they do far more good than harm, in destroying many millions of noxious insects. Only give the crow half a chance and he is the best insect collector known, and there is scarcely anything of the kind that comes amiss, for he has a voracious appetite and a good digestion, and I have known a young half-fledged crow to devour a hundred rose-beetles for breakfast, without appearing to be at all uncomfortable afterward, or lose his appetite for a good dinner of the same.

BIRDS AND INSECTS.

In an admirable address by William Saunders, before the Entomological Society of Ontario, we find the following extracts, which are incorporated in this portfolio with a great deal of satisfaction:

The question of insectivorous birds, and their influence on the insect world about us, is attracting much attention, and the more the subject is discussed the more evident it becomes that very little indeed is *known* in reference to it; that our ideas as to what should guide us are largely inherited, or otherwise based on sentiment, rather than resting upon well-ascertained facts. I am well aware that to plead in favor of the birds is a popular course to follow; but the true student of nature is ever seeking after truth, and whether the facts he discovers are in accord with long cherished opinions and popular fancies, or are directly opposed to them, are questions of little moment. The facts, whatever they may be, are what we want.

Insectivorous birds may be conveniently divided into three classes: First, those which take their food entirely on the wing; second, those which feed partly on the wing and partly from trees and shrubs, and on the ground; and third, those which take no food on the wing, but feed entirely either on the ground or from trees or shrubs. In the first class, besides some rare birds which we do not need to mention here, the following are found common in most parts of our Province: the swallows (*Hirundinidae*), kingbird (*Tyrannus Carolinensis*), pewee (*Sayornis fuscus*), and nighthawk (*Chordeiles popetue*). The food of these birds consists chiefly of flies, a large proportion of which cannot be said to be either noxious or beneficial; many of them in the earlier stages of their existence live in the water, where they devour decaying vegetation, or feast on the lower and simpler forms of animal and vegetable life. The larvæ of many others are scavengers, devouring decaying or putrescent animal and vegetable matter, and hence well deserve to be classed with beneficial insects. In the same class of friendly species will rank a considerable number of others which are parasitic on the bodies of caterpillars; also, the rapacious species who sustain themselves by devouring the weaker and less vigorous of their race. A few rare exceptions, of which the wheat midge and Hessian fly may be noted as examples, are very injurious to field crops, while the mosquito and black fly are universally branded as enemies to the human race. These birds also devour a few butterflies and moths; but these, with few exceptions, are harmless. The question, then, to what extent these purely insectivorous birds are beneficial to the farmer or fruit grower, reasonably admits of much difference of opinion, for while they do devour a few of our tormentors, they probably destroy a much larger number of beneficial insects, the

main bulk of their food, however, consisting of harmless species. Doubtless they serve a purpose of maintaining a proper balance among the insect hosts, and between animal and vegetable life, but that their service in these departments is so all important as some would urge admits of grave doubt.

The birds of the second division, namely, those which take their food partly on the wing and partly from trees and shrubs, or on the ground, are not entirely insectivorous. The remarks just made in reference to the first class will apply also to this as far as their food is taken on the wing, but on trees or shrubs, or on the ground, they consume insects of entirely different classes, chiefly beetles and the caterpillars of moths and butterflies. The beetles admit of a similar division to that of the flies already noticed; the larger number are harmless, a large proportion of the remainder are beneficial, and a few are injurious. Most of the caterpillars of moths and butterflies are harmless, feeding in limited numbers on a great diversity of shrubs and trees of little or no economic importance. A few may be said to be beneficial, in consequence of their feeding on troublesome weeds, such as thistles, etc., while a few others are decidedly injurious. Among the common birds in this second class I would mention the yellow warbler or spider bird (*Dendroeca aestiva*), the red start (*Setophaga ruticilla*), the red-eyed and yellow-throated vireos (*Vireo olivaceus*), and (*V. flavirons*), the various species of wood-pecker (*Picidæ*), and the blue bird (*Siala sialis*).

The birds comprised in the third class are only partially insectivorous. Among the common species are the cat-bird (*Galeoscoptes Carolinensis*), robin (*Turdus migratorius*), and brown thrush (*Harporhynchus rufus*), the sparrows (*Fringillidæ*), the cuckoos (*Coccidæ*), the nuthatch (*Sitta Carolinensis*), chickadee (*Parus atricapillus*), kinglets (*Sylviidæ*), meadow-lark (*Sturnella magna*), Baltimore oriole (*Icterus Baltimore*), and the wren (*Troglodytes ædon*). Besides these there are the blackbirds (*Icteridæ*), which, in the spring, devour more or less insect food, but feed chiefly on grain and seeds the remainder of the year. Nearly all birds, excepting the rapacious species, feed their young on such soft food as worms, caterpillars, soft-bodied insects and fruit, and from the time that young birds are hatched until they acquire the power of flight, a very large quantity of insect food is undoubtedly consumed; but the question of the greatest practical importance to the agriculturist is how far are the birds a help in keeping in check injurious insects. With the object of obtaining light on this point, I have, with the help of my son, W. E. Saunders—who has for some years paid special attention to this matter—examined the contents of the stomachs of a large number of birds, and I must frankly confess that the larger the experience gained in this direction the more I have been convinced that but comparatively little help is got from birds in keeping in subjection injurious insects.

When the cut-worms were so common with us this spring that any bird, with a very little effort, might have had its fill of them, the contents of a number of stomachs were examined, especially those of the robin, but not a single specimen of this larva was found in any of them. It has been urged that some birds devour the larvæ of the plum curculio by picking them out of the fallen fruit, but I have failed to find any confirmation of this statement; indeed, never found a curculio larva in the stomach of any bird excepting once in that of a robin, which had evidently swallowed it by accident when bolting a whole cherry. As for the robin having any claims upon the sympathies of man for the good he does, I fear that but a very slight case can be made out in his favor. Of fruit he is a thief of the worst kind, stealing early and late, from

the time of strawberries until the last grapes are gathered; not content to eat entirely the fruit he attacks, but biting a piece out here and there from the finest specimens, and thus destroying a far greater quantity than would suffice to fill him to his utmost capacity. At the time of writing, flocks of the most pertinacious specimens are destroying the best of my grapes, while alongside is a patch of cabbages almost eaten up with the larvæ of the cabbage butterfly—nice, fat, smooth grubs, easily swallowed—but no such thing will Mr. Robin look at as long as good fruit can be had. His tastes are so expensive that to gratify them is to deprive the fruit grower of a large portion of his profits, hence the sooner the robin ceases to be protected by legislation the better it will be for all lovers of fruit.

The insect world is composed of myriads of specimens which from their varied structure and habits admit of being classified into families, each distinct and usually easily recognizable to the practiced eye of the entomologist. A large portion of this innumerable host is appointed to prey upon and devour the other portions, and thus it appears to me that apart from any consideration of insectivorous birds, that the insect world would and does, to a large extent, take care of itself, and when an injurious species increases beyond its normal limits, its natural insect enemies, having an unusual amount of material to work on, soon become sufficiently numerous to reduce the number of the injurious insect to its normal proportions again. As an illustration, take the now common cabbage butterfly (*Pieris rapæ*). This insect was in some way brought from Europe to Quebec a few years ago. From Quebec it has since spread over an immense area, extending now from Alabama to the waters of Lake Superior, eastward to the Atlantic, and westward many hundreds of miles, and over all this district it has done immense damage to the cabbage crop. Throughout this area insectivorous birds of all sorts prevail. The butterfly is conspicuous, not very strong in flight, and during the day almost constantly on the wing; the larva feeds in exposed situations, is of that smooth character which birds are said to prefer, and, although similar in color to its food plant, is not difficult to detect. Here, then, is an instance where a comparatively feeble insect, particularly vulnerable to attack, has rapidly spread over a large portion of this continent with little or no opposition from insectivorous birds. Indeed I have never yet found or known to be found a single example either of the butterfly or its larva in the stomach of any bird. In its native home in Europe it is seldom so very destructive as here, for the reason that a small four-winged fly (*Pteromalus puparum*), an insignificant looking little creature, is a parasite on the larva of this butterfly, and hunts its victim with the greatest assiduity; alighting on their backs and thrusting its slender ovipositor through the skin of the larva, it deposits a number of eggs there, which hatch into tiny grubs, and these feed upon and eventually destroy the caterpillar. By the constant efforts of this little parasite the cabbage butterfly is prevented in Europe from becoming a very serious pest. Fortunately this little friend has also been introduced here from Europe, although in what manner is not known, and is rapidly spreading, following in the wake of its prey, and where the parasite has fairly established itself this butterfly, with its numerous progeny of green caterpillars, soon dwindles in numbers so materially as shortly to cease to be so grievous an evil. The butterfly spreads faster than its enemy and is usually several years in advance of it, but we may confidently anticipate that sooner or later this small fly will do for us what it has done for Europe—keep this troublesome insect within due limits. Many other similar examples might be given.

Further, the help of friendly parasitic insects is so much more efficient be-

cause it is in most instances discriminating. As far as is known, the little parasite referred to attacks only the larva of the cabbage butterfly, and in like manner many other parasitic species are restricted in their operations to a single species, while in other instances they are confined to a genus or a group of similar species. This is not so with some insectivorous birds; they in most instances devour alike the useful and the injurious species, and the question may well be raised in many instances whether the good they do is not more than counterbalanced by the number of useful insects they devour. Recent observations on the family of thrushes by Mr. S. A. Forbes, of Illinois, seem to show that their insect food consists largely of beetles belonging to the *Carabidae*, a family every member of which is useful, since they feed, both in the larval and beetle states exclusively on other insects.

The field here open is a wide and inviting one, on which I trust some of you will enter. I have but touched upon it; as the results of more extended observations are recorded the opinions here expressed may need modifying. I desire to do justice to the birds.

MOLES.

A correspondent of the New York Tribune, from Van Buren county in this State, speaks of his method of trapping moles. He says:

I have been bothered considerably by moles in corn-fields and garden until the last year or so. I tramp their tunnels down and watch for them—not generally longer than two hours. As soon as one makes his appearance, raising the dirt, I cut him in two with an ax, and leave the dead mole in his hole, which drives the others away. In my garden of two acres, last spring, I believed there were several. I thought they were going to completely destroy it, but after cutting one, as above, I did not see any more of their depredations.

A writer in the Rural New Yorker takes the following sensible view of this animal: "A recent correspondent of the Rural has entered a plea for the mole, and perhaps as good a one as can be made; but I think he has failed to comprehend the mole unless he has him under a subdued character. The mole is an unmitigated nuisance where he abounds in numbers, destroying peas, corn, potatoes, strawberries, the lawn, and everything that comes in his way. Of all the pests that trouble the field, the garden and the lawn, there are few that are made up of so much pure 'cussedness' as the mole. To employ him to destroy larvæ and worms is to use a remedy worse than the disease. It will take a year or two at least to repair the damage he has already done in my experimental garden. There is this, however, to be said in his favor, that he is a fine example of perseverance."

INSECTS AND DISEASES.

ENTOMOLOGY FOR THE FRUIT GROWER.

The subject of insects and diseases is daily attracting more attention, for their depredations are daily becoming a greater evil, and the importance of entomological investigation is every day more plainly seen. It is less than fifty

years since Dr. Harris first published his work on "Insects injurious to vegetation," and great is the debt of gratitude which we owe to him and succeeding investigators who have given their lives to studying the habits of these "little creeping things which be upon the earth," that they may teach us how to destroy those which prey upon our lives, and so distinguish our friends from our enemies. Every plant imported from abroad brings with it a new insect or disease, and the dissemination of new plants and varieties, without which there can be no progress in horticulture, inevitably disseminates their insect enemies. On this subject the words of Edmund Burke are appropriate: "The most vigilant superintendence, the most prompt activity, which has no such day as to-morrow in its calendar, are necessary to the farmer," and we may add, still more to the fruit-grower, and tenfold more necessary in combating our insect enemies; but as long as moral evil exists in the world, so long may we expect there will be evil in the natural world, and he who is not willing to contend against both is not worthy of the name either of cultivator or of Christian.

MARSHALL P. WILDER.

MIGRATION OF THE CODLING MOTH.

Mr. S. B. Peck, of Muskegon, who has contributed many valuable articles to the reports of our society, thus discusses in the *New York Sun* on the codling moth:

The writer claims to have discovered, some six years ago, that the first brood of this larva left the apple in which it was hatched as soon as the apple became dead or ceased to grow, and entered a sound one, and so on, destroying ten to twenty-five apples. If this be true, as I shall herein attempt to prove, it is plain that our most effectual warfare is to pick off from the tree all the wormy apples as fast as they appear, and destroy them with their occupants. O. C. Chapin, an extensive apple grower of Western New York, although not admitting this emigration theory, admits that picking off the infected fruit and destroying it has been his most effectual remedy.

Presuming that every one who has watched the effects produced by this first brood of larvæ has noticed that the apples showing infection have ceased to grow, and are under the size of sound ones, and that this discrepancy in size increases from day to day till the apple drops, the plain inference appears to me to be that this worm, which is said to "pass quickly to the heart of the fruit" after hatching, thus destroys the vitality of the apple, and if so, how long will this blasted apple afford nutriment to its voracious enemy? Most certainly not for the thirty days which are said to be about the length of its larvahood. On this head I quote from my records of 1875 to show the voracity and gluttony of this pest. "July 14, placed a vigorous and full grown larva on a rhubarb leaf, gave him a sound apple of $1\frac{1}{2}$ inch diameter, and covered them from the light. In twenty hours I found him inside, with the apple about as nearly gutted as we ever find them." And while speaking of experiments, I will state that myself and others have frequently placed the worms on solitary sound apples, and invariably found them inside, and my neighbor says, "a full grown worm does not take much time for it." I have several times placed sound and unsound fruit in a box, and generally found, after a day or two, some of the sound ones infected, but not always, for when we pick off wormy fruit

we do not always know (as I shall herein show) whether any of them are tenanted or not; besides, the fruit is placed in an unnatural position; the worm cannot enter on the smooth, open side of the fruit, but seeks the stem or calyx end, or where a leaf rests upon it, or two apples touch each other, in which latter case the worm has been caught in its passage from one to the other, while its plainly marked trail of transit is visible in other cases.

One other proof: If we put the most enticing bands around the smooth body of a heavily laden and infected tree, with no hiding places for the larvæ under it, and examine the bands, say about the middle of July, we shall probably find at least ten larvæ and pupæ under the trap. Now count the wormy apples on and under the tree, and we shall find that they number over one hundred, or more than ten times the number of larvæ and pupæ caught. Now, if my position is not true, where are the ninety or more worms? They are not on or in the ground, as some suppose; that would be contrary to all authority and all experience. "Oh," some may say, "the birds have taken them." I don't believe it; the worms are in their hiding places during the day, and during the night the birds are asleep; besides, with me the insectivorous birds are never here except during cherry and currant time, after which they leave. Some persons give much credit to the robin as a destroyer of this vermin, but who ever saw a robin hunting for an apple worm, or an apple pecked open to get the worm? That the worms have been taken from under paper bands by some birds I have good evidence, also that birds have taken them from under the scales of bark, but I have no evidence that they have been taken from any other bands, or from scales in any amount to materially affect the damage done. I have claimed that the worm leaves the apple before it falls, and seeks a new place for fresh food. Prof. Beal of the Michigan Agricultural College found that of 250 wormy apples found under the tree, not one had the worm in it, and of 250 infected taken from the tree, only about one quarter contained the larvæ; "the rest had crawled out." It seems he did not suspect that they had gone into sound fruit, a fact of which, I think, he will be convinced, if he follows up the investigation with the care which he manifests in other matters.

That one critic should say, "I don't believe a word of it," and another should fail to effect the emigration by putting sound and unsound fruit together, weighs little with me, for it takes a great many negatives to disprove one positive. Careful investigation in this case is worth more than a thousand obsolete theories. It is not long since most people believed that these larvæ went into the ground to hibernate, like the plum curculio and the currant worm.

What I have so far said relates solely to the first brood of the larvæ; the second brood, or those which enter the fruit when nearly or fully grown, do not necessarily kill the fruit, and often remain in it till gathered and stored; that they do sometimes even then change residences I had begun to suspect, and on asking the opinion of an extensive apple-grower, "I know it to be so," was his reply. Two other apple-growers thought the same. It is the first brood that does most of the damage, but it is the second brood alone that farmers generally notice. Another season I hope to become better acquainted with this second brood.

REMEDY FOR APHIS.

A remedy for plant lice upon the terminal shoots of rose bushes (or similar hardy plants), said to work like a charm, is as follows: 'Take four ounces of

quassia chips and boil for ten minutes in a gallon of soft water. Take out the chips and add four ounces of soft soap, which should be dissolved in it as it cools. Stir well before using, and apply with a moderate sized paint brush, brushing upward. Ten minutes after syringe the tree with clean water to wash off the dead insects and the preparation, which would otherwise disfigure the rose trees.—*New York Weekly Herald*.

CHLORIDE OF LIME.

Le Cultivateur, a French journal, says that if chloride of lime be spread on the soil or near plants, insects and vermin will not be found near there, and add: "By its means plants will easily be protected from insect plagues by simply brushing over their stems with a solution of it. It has often been noticed that a patch of land which has been treated in this way remains religiously respected by grubs, while the unprotected beds around are literally devastated. Fruit trees may be guarded from the attacks of grubs by attaching to their trunks pieces of tow, smeared with a mixture of chloride of lime and hog's lard, and ants, and grubs already in possession will rapidly vacate their position. Butterflies, again, will avoid all plants whose leaves have been sprinkled over with lime water."

THE WEAVIL.

A correspondent writes: "I have observed of late numerous complaints of the difficulty of guarding pea and bean seed from the weevil. Your subscriber has found an effectual remedy, and gives it for the benefit of those seeking such. After harvesting dry thoroughly in the sun, and afterward place in jars, cans, or barrels, that have been thoroughly heated before the fire, placing in each vessel a bottle of turpentine, not corking the bottle, but simply tying a piece of cloth over its mouth. Cover the vessels as air-tight as possible, and afterward expose to the sun occasionally. The fumes of the turpentine engendered by the heat kill the egg of the weevil deposited in the seed when it is green. This is an effectual remedy, and should be known to all seed-growers north or south.—*New York Weekly Herald*."

EFFECTS OF SEVERE COLD ON INSECTS.

A very general impression prevails that severe winters are prejudicial to insect life. It is, however, a quite erroneous impression, for nothing has struck us so forcibly in our experience with injurious insects, as the fact that in most cases they pass more safely through a steady, even if severe winter, than through a mild or changeable one. We have repeatedly called attention to this fact in our own writings, and Miss E. A. Omerod, in her "Notes of Observations on Injurious Insects" for 1879, has some pointed remarks on the subject, in connection with the severity of the past winter in England.

Severe and steady cold is not only favorable to insect hibernation, by causing a continued state of torpor, but indirectly in preserving them from the attacks

of birds, and other animals, which, during the severe weather, cannot reach them in the frost-bound ground.

Mild winters, on the contrary, generally cause premature activity in insects, often followed by relapses into the torpid state, and such changes are prejudicial to their well-being. Insectivorous animals also fare better during such mild winters.—*American Entomologist*.

TANSY FOR CABBAGE WORMS.

The following item from the *Country Gentleman* is certainly worth saving and the remedy worth a trial:

I have saved my cabbages for two years by steeping tansy and pouring it on after they begin to head, two applications proving to be necessary. This season the millers commenced depositing their eggs before the cabbages began to head, and I gave them a dose over two weeks ago, and there is no sign of any worms since.

SICKLY TREES.

I notice in your paper of 10th inst., advice to whitewash apple trees which have the dry black rot. Now my experience is that whitewashing injures and frequently kills fruit trees. One of my neighbors has succeeded in killing quite a number of thrifty young pear and cherry trees by annual whitewashing. I have experimented myself fully and freely with whitewash, and find that annual applications are sure to kill the trees. For your rotting and sickly fruit trees dig around the trees well, then manure freely, sprinkle a peck of salt on the ground under each tree. After the tree leaves out make a strong salt brine and sprinkle the foliage well two or three times during the summer. Hogs frequently injure fruit trees by rubbing against and loosening the bark during the flow of sap.—*L. N., in Indiana Farmer*.

SIMPLE INSECTICIDE.

As an insecticide, the juice of the tobacco plant is said to be of great value. The leaves and stems are well boiled in water, and when the fluid is cold it is sprinkled over plants attacked by insects, when it at once destroys caterpillars, black and green fly, gnats, and other enemies to vegetables, and in no way impairs the growth of the plants. A peculiar odor remains and prevents insects from coming again for a long time.—*Indiana Farmer*.

TWO VALUABLE INSECTICIDES.

London purple. Prof. C. V. Riely in his Bulletin No. 3 of the U. S. Entomological Commission, says of London purple: "This powder is obtained from the manufacture of aniline dyes. Crude coal-oil is distilled to produce benzole; this is mixed with nitric acid and forms nitro-benzole; iron filings

are then used to produce nascent hydrogen, with the excess of nitric acid in the benzole. When distilled, aniline results; to this arsenic acid is added to give an atom of oxygen which produces rose aniline, and quick-lime is added to absorb the arsenic. The residuum which is obtained by filtration is the London purple of commerce. The compound is therefore made up of lime and arsenious acid, with some carbonaceous matter about each atom. Experiments which I made with it in 1878, as an insecticide, and its use on the Colorado potato-beetle by Professors Budd and Bessey of the Iowa Agricultural College proved highly satisfactory."

Mr. A. R. Whitney, of Franklin Grove, Illinois, found it to be a perfect antidote to the canker-worms which had not been prevented from ascending the apple trees, and experiments upon the cotton-worm conducted under his direction all showed that its effects are fully equal to those of Paris green. Like the latter it kills the worms quickly, and does not injure the plants, if not applied in too great quantity.

Its cheap price removes all temptation to adulterate it, as every adulteration would prove more expensive than the genuine article. It is superior to Paris green, because of its finely powdered condition, which allows it to be more thoroughly mixed with other ingredients and thus used in smaller proportion.

Very careful experiments made with the view of ascertaining the proper amount of dilution to give the powder resulted as follows: Half pound of the poison to eighteen of dry dilutents proves satisfactory, and any greater amount is simply a waste of the material. If applied in water, half pound of the powder to from fifty to fifty-five gallons of water is the proportion which will give most general satisfaction, by killing the worms and not injuring the plants.

London purple can be sold in New York at the low rate of six cents per pound, and at corresponding rate in internal towns, thus bringing the cost of the insecticide very much below anything else in the market. It has the further advantage over other arsenical compounds, in its penetrating power; it seems to be more effectually absorbed into the substance of the leaf and is therefore more persistent.

Pyrethrum Powder. From the same authority we cull the following regarding the Pyrethrum insecticide. It is used against various household pests under the names, "Persian Insect Powder," or "Dalmatian Insect Powder," and sold at prices that forbid its use in the field. The former is the powdered flower of *Pyrethrum carnevin* and *P. roseum*; the latter is made from *P. cenerariæfolium* a native of Dalmatia. Experiment by Wm. Saunders of Ontario, and Prof. Riley, prove that the powder produces most satisfactory results when applied to field insects. A single puff of the powder upon plants covered with the cotton-worm sent the insects wriggling to the ground. In this substance we have an excellent insecticide, which is not dangerous either to plants or man, and the only thing apparently to be considered in connection with it is how to reduce the cost so as to bring it within reach of the means of those who need to use it.

A Mr. Milco, of Stockton, California, is trying to solve this problem, and has begun raising the plants used in making the Dalmatian powder. The powder which he has made is selling now in California at \$1.25 per pound, but he expects to reduce the cost of production to less than a twelfth of this amount when the business is fairly established.

Pure Pyrethrum powder was mixed with a small quantity of powdered rosin and applied to plants infested with cotton worms of various ages; the smaller

worms died in from 10 to 20 minutes; larger worms soon became uneasy and fell to the ground, when they invariably died in from five to twenty-four hours.

BUCKWHEAT AND INSECTS.

The London Farmer has the following, that may be suggestive of experiments in our country: Many years' practical experience has convinced M. Lagarde that sowing buckwheat in soils infested with white worms, grubs, ants, etc., etc., allowing it to grow until it flowers, and then plowing it in as a green manure, effectually frees them from all their subterranean parasites. The crop, especially the variety known as Tartary buckwheat, springs up rapidly, chokes all the weeds, and abstracts but little nitrogen from the soil, as it draws its principal nutriment from the air. It decomposes very quickly in a good soil, doubtless owing to the spongy nature of the leaves. This decomposition is immediate, and the large amount of gas liberated asphyxiates the larvæ of various insects in the ground. M. Lagarde suggests this as a possible remedy for phylloxera by sowing among the vines and digging in about the roots.

PHYLLOXERA.

The phylloxera has up to the close of last year extended over more than 1,600,000 acres in France, and utterly ruined the vines in 700,000 of them. The appearance of the insect is even reported in the Modoc, the most famous vine-growing section of France, and Chateau Lafitte for which Baron Rothschild paid \$830,000 two years ago, is nearly ruined. At this rate it is expected that the whole district will be infected before the end of next year. Sulphuret of carbon is the most favored remedy, though deep trenching and manuring, with an application of turpentine and powdered rosin on the roots, is said to be a cheaper and equally effective remedy. Some vine-growers are planting American stocks, thinking them less liable to attack.—*Land and Home.*

PEACH BORER IN ALMONDS.

Mr. A. S. Fuller gives a little experience under the above caption in the American Entomologist: During the past few years the flowering almond shrubs in my garden have shown signs of disease. Investigation proved that the roots and stems just below the surface contained large numbers of the larvæ of the common peach borer (*Egena exitiosa*). Peach trees being very little grown in my vicinity, the borers took to the almonds. Having plenty of the shrubs, I concluded to watch the insects and their development. At various times during the season I dug up plants and invariably found larvæ of all sizes, but no pupæ were found under the bark or in the earth immediately about the shrubs, a fact which leads me to believe that the grubs go a much greater distance to pupate than is generally supposed. Pupæ that are so often found in the gum of peach trees are probably imprisoned there and can not get away, or they would be in a more congenial place for their final transformation. Harris says that the pupæ are found in the gum of peach trees, also under the bark and in the ground, but so far as my observations extend they always seek the last.

The old dwarf almond bushes in the gardens are excellent breeding places for this insect, and it would be well for all who love such plants to examine them occasionally, and destroy the grubs.

PEAR BLIGHT SPECIFIC.

A. Kelley, in Fruit Recorder, explains that he has had forty years of experience with pears and has had a great many trees killed by blight, but has been uniformly successful in combating the disease with copperas wash since he began it. He uses a pound or two of copperas to a gallon of water and thickens it with lime or sulphur so it will show when applied; puts it on near June first, after removing every sign of blight. When a limb is cut off, he saturates a cloth with the mixture and binds it over the exposed end. The copperas is cheap, costing less than five cents per pound in quantity, and he has restored trees that were half blighted by a thorough use of it.

Mr. S. B. Peck, of Muskegon, says that his experience rather confirms this notion. He remarks as follows:

Noticing lately several recommendations of "iron as a fertilizer" and "salt for pear blight," calls to my mind the following: Some eight or ten years since I found the blight had attacked a few dwarf pear trees on my ground. This was the kind of blight in which the young wood suddenly turns black. I applied to the surface of the ground, under the trees, a strong solution of sulphate of iron (copperas) several times till the soil was of a yellow color, pruned severely all the affected wood, and have never seen any blight there since. I would not state that iron will cure pear blight in all or any cases, or even that it did so in this case, but I should most certainly apply the same remedy should blight occur again on my premises.

BACTERIA AND PEAR-BLIGHT.

Prof. T. J. Burrill, Professor of Botany and Horticulture at the Illinois Industrial University, followed with a paper on "The So-called Fire-blight of the Pear and Twig-blight of the Apple Tree." His remarks, bearing as they do upon a subject of general interest, are given at some length.

He said the widespread and disastrous disease of the pear tree, called fire-blight, and that no less prevalent and alarming one known as twig-blight of the apple tree, are due to the same immediate agency. They are identical in origin, and similar in their pathological characteristics, as *a priori* reasoning might have indicated. The quince and probably other plants, among which might be named the butternut, the Lombardy poplar, and the American aspen, also suffer from the same disease. From descriptions it was very probable that the "yellows" in the peach will be found due to a similar cause. The immediate and exciting cause is a living organism producing butyric fermentation in the carbonaceous compounds, starch, etc., in the cells of the affected plants, especially in those of the bark outside of the liber. This organism, if really specifically distinct, is closely allied to the butyric *vibrio* of Pasteur and *Bacillus amylobacter* of Van Tieghem. The disease has been known in this country over 100 years. Various theories have been advanced, and one by one dis-

proved, except the one of fungus growth. In 1878 the writer announced to the Illinois Horticultural Society the discovery of bacteria apparently connected with the disease. His investigations were carried on in an orchard where there were 94 apple trees, 20 pear trees, and one quince. "After finding myriads of bacteria in the fluids of the diseased tissues," he said, "I inoculated several pear and apple trees with what to me, at the time, were unsatisfactory but not uninformative results. Beginning on the first day of July, 1880, I experimented in various ways at different times upon 66 trees of the pear, apple, and quince. Of the numerous applications of the virus upon the unbroken bark or leaves, none were successful. Of the inoculations there were successful 63 per cent of the pear, 30 per cent of the apple, and 100 per cent of the quince. Upon the pear and quince trees used for the experiments, the disease appeared only in a single case except as the direct result of the inoculation. This latter was sometimes performed with a knife, sometimes with a needle, always with careful precautions and close subsequent examination. Such experimental limbs as permitted it were cut and preserved like herbarium specimens, and are exhibited with the paper.

The organism found answers fairly to the description of Pasteur's butyric *vibron*. They are usually oblong, rounded at the ends, mostly connected, two together. Their motions are not rapid, consisting of turning in every direction, and sliding irregularly forward. They are found within closed cells, in the open spaces, and in immense numbers in the viscid exudations from the diseased bark and leaves. The most conspicuous alteration observed in the tissues is the disappearance of the starch grains from the cells. The cell walls are left intact, and the protoplasmic portions remain until after the starch is mostly absorbed, and appears to suffer little change until death ensues. The disease is, *par excellence*, one of the bark. The leaves die in consequence of this, or are themselves invaded, either primarily or secondarily, by the destroyer. The progress of the disease is always slow, but the leaves of an affected limb often turn black quite suddenly, perhaps according to meteorologic conditions. In diseased bark, before change has taken place visible from without, and while the leaves are still green and fresh, an active fermentation occurs. This continues until desiccation or the exhaustion of the fermentable substances puts an end to the process. The products of this fermentation are carbon dioxide and butyric acid, or a closely similar substance. From the fact that virus from the pear affects the apple tree, and *vice versa*, the speaker argued that the disease was similar in each. The experiments tended to show that the virus is harmless upon the epidermis of healthy plants, nor does it penetrate through the breathing pores. The speaker exhibited drawings of the cells of a healthy plant and a diseased one, showing that the starch in the latter was gradually absorbed. He obtained the virus from diseased trees, where it is exuded, and placed it in distilled water. Upon the dead leaves and branches the virus dried and looked like varnish. When re-dissolved it retains its vitality. The simple puncture of a bark of a tree with a needle which had been dipped in the virus would be sufficient to cause its death. Prof. Burrill exhibited a small vial containing about a teaspoonful of the virus in solution, which he said was sufficient to destroy a whole orchard.—*Science*.

THE PEACH TREE YELLOWS.

Prof. T. J. Burrill writes as follows to Science:

A peculiar disease of the peach, known as the yellows, has long been the scourge of the principal peach growing districts of our country. Its appearance somewhat recently in Michigan caused much alarm, and since its occurrence throughout great orchards in some of the best fruit districts of the State, special attention has been called to it.

In Science for September 25, 1880, page 162, there appeared an abstract of a paper read by me before the American Society of Microscopists at Detroit, upon the blight of pear and apple trees. In this paper I expressed the opinion that the "yellows" of the peach tree would be found due to an organism similar to that found to be the cause of the pear tree blight. This opinion was based upon my knowledge of the latter disease, upon the thoroughly confirmed contagious character of the "yellows," and upon the failure of competent investigators to find, after extended research, anything like the ordinary parasitic fungi. It was long ago conceded by entomologists that the disease did not arise from the depredations of insects.

I am now able confidently to assert that this devastating disease of the peach is caused by Bacteria!

These minute, moving, living things are found in great numbers within the cells of the diseased tree. They are apparently specifically different from those of the pear tree, being comparatively more slender. What I take to be the typical form—all very considerably—is very nearly $1\ \mu$ by $3.5\ \mu$ (.0000343 in. by .0001202 in.), made up of several not very evident articulations. They rest in some stages nearly or quite motionless, and in this condition show a curious peculiarity of lying in ranks, side by side. In other periods of development they move in an unsteady, undulating manner, with considerable rapidity; they turn, twist and tumble on their sides, on end, now drifting with the current, now swarming in an inextricable maze in the field of a first-class one-tenth objective.

As the Bacteria increase, the starch grains, stored by the tree for its own nourishment disappear, and I doubt not further investigation will prove that, as in the blight of the pear and apple, butyric fermentation takes place. The diseased tree probably suffers in other ways from the presence of these minute parasites, but we may say with truth that it really starves to death. Its food, gathered from the earth and air, assimilated by the leaves and stored for immediate or future use, is ruthlessly seized upon and destroyed. No doubt this takes place at all times of the year, when the temperature of the surrounding air is considerably above the freezing point; but the Bacteria are probably most active in the summer time.

Judging from my experiments upon the pear tree, the destroyers only gain entrance to the tissues of the tree through wounds in the epidermis or bark; but it is possible that at the time of flowering they penetrate by way of the stigma, which is not protected by an impervious coating.

The cellulose tissue of the tree is not destroyed, and it is still a puzzle how the Bacteria, minute as they are, pass from cell to cell. As in the pear, it is probably a very slow process, and is not connected with the circulation of fluids in the tissues.

The discovery of Bacteria as the cause of disease in plants may prove a notable contribution to the "germ theory" of disease in animals.

BARK TREATMENT OF APPLE TREES.

Of the advisability of washing the bodies of apple trees there can be no question; but we should not place too much reliance upon this practice, and thus neglect the more important things of proper manuring and care of the soil. As a rule, when we see trees coated with moss and fungus, with the bark hanging in loose patches or infested with lice, we can look for the cause in improper or no culture, or want of manure; but when we find trees in this condition we can much sooner restore them to health and vigor by applying a suitable wash. I object to all the potash washes for apple trees, because, while they will kill moss and remove the loose bark, they seem to burn the tender bark beneath and make it of an unnatural, reddish color, and it again soon cracks or scales up and hangs loosely upon the tree.

Not so when we use a wash made with caustic soda. While this takes off all moss patches, fungus, and rough bark, and while it will kill all kinds of bark-lice and other insects equally with the potash washes, it leaves the smooth bark a fine healthy green color and not inclined to break loose from the tree. If one cannot get caustic, take sal-soda, put it into an iron kettle, placed over a fire, and let it remain, occasionally stirring, until it turns of a reddish color, which it will when sufficiently heated. It will thus become caustic and answer very well in place of the caustic soda of the shops. If washing does not effectively remove all loose bark, I would use an old hoe or a tree scraper to remove all loose bark. I have occasionally seen orchards scraped hard enough to remove the outer bark and show large spots of white bark. This I regard as a very bad practice, and not to be allowed. I repeat: if an orchard is properly manured and occasionally washed, it will have very little loose bark, and will require scarcely any scraping.—*J. S. Woodward, in N. Y. Tribune.*

HIGH CULTURE AND DISEASE.

From the Land and Home we clip the following item: Floriculturists begin to think that the diseases which afflict plants under high culture are due, as among men and domestic animals, to their forced and unnatural lives. The hyacinth is rapidly deteriorating through disease caused by the nipping of the blossom to increase the bulb; and lilies, which have long been subject to disfiguring spots, are now taking a disease involving the bulb as well as the flower. Verbenas, also, have lately been affected by a disease that first attacks the leaves, and then kills them; even the lusty crocus suffered from some unknown trouble last spring; while hollyhocks have been so liable to their own form of disease, that they have been banished from many gardens. The remedy would seem to be to let the plants grow more naturally, with less forcing.

FLOWERS AND THEIR CULTURE.

MUSIC AND FLOWERS.

Matter-of-fact farmers, with more stomach than brains, are apt to laugh at those who love music and flowers, and to pronounce the careful cultivation of either the veriest nonsense. To them, the only crops worth raising are those

that can be turned into food or dollars and cents, and the time spent in cultivation of flowers is thrown away. Such men lose half the enjoyment and happiness that those of finer instincts know, and live constantly with mind and soul clasped in the narrow compass of a pocketbook, or lost in the demands of daily dollar-grabbing and the gross appetite. Yet those who love and cultivate flowers are generally as well-to-do as their scornful neighbors, and the number of wealthy ones among them is quite as large. Then the pleasure they receive from the constant coming of beautiful marvels around them; from the ever recurring mystery of blade, and bud, and blossom; from the myriad bright-eyed favorites that repay them for their care by smiling daily into their faces, filling the air with fragrance and the soul with satisfaction—is simply incalculable. He who created the golden grain made also its many-hued cousins, the flowers, and no doubt intended that they should be loved and cherished. Better to starve the animal nature a little to satisfy the spiritual than to starve the soul—suppressing all its longings for the beautiful, but to minister to the animal nature of man. Love of flowers never yet led to misery or ended in the prison cell or at the gallows, while love of gold has, a thousand times and more. Music and flowers may be evanescent and transient delights, but we should miss them sadly from our lives and few things could compensate for their loss. Some pleasures people must have, and none are better or more harmless than the pursuit of such happiness as bright-eyed blossoms and silver-souled song afford.—*Grange Visitor*.

THE HEPATICA.

John Burroughs says of this delicate spring flower :

What an individuality it has! No two clusters alike; all shades and sizes; some are snow-white, some pale pink, with just a tinge of violet, some deep purple, others the purest blue, others blue touched with lilac. A solitary blue-purple one, fully expanded and rising over the brown leaves or the green moss, its cluster of minute anthers showing like a group of pale stars on its little firmament, is enough to arrest and hold the dullest eye. Then I have discovered that there are individual hepaticas, or individual families among them, that are sweet-scented. This was a great surprise. The gift seems as capricious as the gift of genius in families. You cannot tell which the fragrant ones are till you try them. Sometimes it is the large white ones, sometimes the large purple ones, sometimes the small pink ones. The odor is faint, and recalls that of the sweet violets.

FLOWERS AROUND ENGLISH HOMES.

To an American, the cozy and flower-encircled homes of the lower classes in England are objects of great interest. No home outside of the pent-up alleys of cities is so humble or so poor as not to have sweet flowers about it in profusion. Yesterday I was at the conservatory and watched with wonder the orders given by poor people for plants of almost every known variety. Really, it was surprising to see a man, evidently a day laborer, order five shillings' worth of plants "to set about the 'ouse." I happened to know that during

the winter, charity was called upon to help support his family, and yet when the sun came out warm and bright, and he had secured work, the first thought was about the flowers to make a poor home more cheerful. Evidently no prince or peer derives more pleasure from his superior station than does this farm laborer from his flowers. After all it is not the wealth one has that brings happiness and makes life enjoyable, but the "sweet content" that pervades the heart and home.—*Floral Monthly*.

FLOWERS ON THE TABLE.

Set flowers on your table—a whole nose-gay if you can get it, or but two or three or a single flower—a rose, a pink, a daisy, and you have something that reminds you of God's creation, and gives you a link with the poets that have done it most honor. Flowers on the morning table are especially suited to them. They look like the happy wakening of the creation; they bring the perfume of the breath of nature into your room; they seem the very representative and embodiment of the every smile of your home, the graces of good morrow; proofs that some intellectual beauties are in ourselves or those about us, some Aurora (if we are so lucky as to have such a companion) helping to strew our life with sweetness, or in ourselves some masculine wilderness not unworthy to possess such a companion or unlikely to gain her.—*Leigh Hunt*.

MIGNONNETTE AS A TREE.

Choose a straight young plant; tie it to a slender stick; keep the side shoots nipped from the lower part of the plant, but let all the single leaves remain, also, the side shoots on the upper portion. When the flower buds form, nip them off; a multitude of young shoots will put out after this; when they have grown to be three or four inches long a few of them must be selected, and the balance cut away. The number will depend on the size and strength of the plant; certainly not more than eight should be left; six would be better. They must be equal distances apart, and should be trained to a small hoop supported at the proper height. The second flower buds may be left on, but before they open a second hoop must be added to the trellis, and the branches secured symmetrically to it. Be careful to remove every flower before any seed-pods have time to form. This system of pruning and training is to be carried on and in the course of time the stems and branches will become woody, and the "tree" will bloom almost constantly.—*Prairie Farmer*.

THE MULLEIN.

The common mullein, regarded as but a common coarse weed in this country, and so common in fields as to often prove a nuisance, is cultivated in England for its beauty. A writer in the *Gardeners' Chronicle* says that it "is well worth the attention of both amateur and professional gardeners." It seems

that it is known in England by the common name of "Aaron's Rod." "There are two reasons," says this writer, "why it should be called by this name: First, the Romans dipped the stems in tallow, and burnt them at funerals. Secondly, the simple spike is long, cylindrical, and on it is a quantity of densely packed, very large, handsome golden-yellow flowers. The stem is five feet high. The flowers, when dried in the sun, give out a fatty matter, which is used in Alsace as a cataplasm in the hemorrhoidal complaints. Formerly the plant was called *barbascum*, from *barba*, meaning a beard, an allusion either to the shaggy nature of its foliage, or else to two of the five stamens, which are hairy.

FRAGRANT FLOWERS.

The pleasures of gardening, both indoors and in the open air, are greatly promoted by the introduction of sweet-scented flowers. At the present time in many collections, the *Olea fragrans*, *Daphne Indica*, Orange and Lemon, give grateful perfume; and how pleased we all are to meet these old favorites when in bloom. Later on, the *Gardenias*, *Rhyncospermums*, etc., blossom, and by a little judgment it is easy to have some sweet-scented plants in flower the whole season through. To those accustomed to walk through the woods in the spring-time, the pleasure derived from the fragrant flowers need not be told. And many of us know how positively beneficial to the invalid is a bunch of delicately scented flowers. It gives instant pleasure by its sweetness, and awakens a desire to be able to be about to enjoy nature's gifts more fully.

We cannot do without our gay-colored flowers for bedding and other purposes, but we ought to have our odoriferous plants more widely known. In almost all catalogues we find plants grouped under various headings, such as "ornamental foliage," "climbing," "variegated," etc. I think it may pay to add what many often look for, viz.: sweet-scented plants.—*W. E., in Gardeners' Monthly.*

WHAT FLOWERS WILL GROW IN THE SHADE?

This question is put to me every spring by scores of city people, whose little patch they wish to devote to flowers is so walled up by neighboring houses that the direct rays of the sun never touch it. But few plants will develop their flowers there, and none will do it as well as if it were lighted up by sunshine a part of the day. *Fuschias*, *pansies*, *forget-me-nots*, *violets*, *lobelias*, *lilies* of the valley, *phloxes*, and other *barbaceous* plants whose native habit is shady wood, will do best, but even these languish if denied all direct sunlight.

The best effect in such situations, is produced by ornamental leaved plants, the beauty of which is not dependent upon their flowers. Among these may be mentioned the gold and silver variegated leaved *geraniums*, *acryantus*, *alter-antheras*, *begonius caladiums*, *centaureas*, *coleuses*, etc., which, if planted so as to bring the various shades in contrast, produces a pleasing effect, which continues during the entire summer months, and is not surpassed by any display of flowers.—*Peter Henderson.*

THE GERMAN METHOD OF PRESERVING FLOWERS.

I observe that a lady correspondent in the March number complains she cannot succeed in making things bloom with the German method of submersion in chemically prepared water. The ladies of my household have no trouble in producing bloom on apple and other free-blooming things by the following very simple plan. They place the apple twigs or whatever they desire to bloom in clear glass vases, and place the vases where they will get a great deal of sunshine, as in a bay window. Apple twigs cut about March 1st, are just about ready to burst into bloom at this date (March 18th). The vases are kept filled with rain water only. I have paid no particular attention to the matter, but think the bright sunshine is quite an important part of the experiment, as they failed last year when they attempted to bloom apple, and in a dark but warmer room.—*Gardeners' Monthly*.

CHEAP WINTER FLOWERS.

I have said so much about the care of plants that I am sure you will begin to think there is nothing more to be said. Yet there is always something interesting about plants. Each variety has a beauty of its own, and while we may admire one flower we may love another. Some varieties give us rich colors, others beauty of form, while others delight us with their fragrance of flower or foliage. Although plants are costly, they are very beautiful, and yet there is no ornament either inside or outside our homes so lovely and tasteful as plants and flowers. The architecture of your house or room is rarely noticed, but the living arabesque of a thrifty vine over your door or around your window are lessons of taste and beauty. A home is sadly deficient without a few of these simple, yet refining ornaments. But all cannot afford greenhouse plants, and it is for this class that I am writing this letter, for the poor as well as the rich can appreciate the beautiful. If you want something pretty and green in your window this winter, get some small boxes or pots, fill them with two-thirds garden soil (sandy) and one-third compost; then sow a few seeds of mignonnette for fragrance in one box, in another candytuft for white flowers, and sweet alyssum is also good. For a pretty vine plant two or three seeds of cardio-spermum (balloon vine). For blue flowers sow argeratum, and nothing can be prettier, either in the house or garden, than the saucy little pansy. If you have dielytra (bleeding heart) in your garden, lift a small root and put it into a pot or box, and it will bloom in the house in mid-winter. I had a root in blossom for four weeks last winter, and I will pot a root this month just to have a little spring in my sitting-room this winter. I have taken rooted slips from the prettiest of my verbenas and potted them. Don't think of saving the old verbenas root; it don't pay. The verbenas is a plant that will spread out, generally covering a space three or four feet square. The branches root to the ground, and if verbenas are wanted for winter take up some of these branches. The striped and blotched petunias are also pretty for a winter plant. I had an oxalis in bloom all winter. They are very pretty little plants, and the bulbs are quite cheap. Another pretty thing in my window was a box of crocus which blossoms a long time. The tiny lilies, as white as the snow that covered the ground. A jonquil also blossomed, but I could not like the fragrance, although others thought it very nice. The snow-drop will also bloom

in the house, as will also the hyacinths, tulips, narcissus and lilies, also lily of the valley. These bulbs must be potted in rich, sandy soil. Hyacinths must not be covered with the soil; let at least one-fourth of the bulb show itself above the soil. Tulips should be covered lightly, as also the others. After potting give a little water and set in a dark, cool place for about three weeks, then bring into the light. The tops will not have grown much, but the bulbs will have made roots. Care must be taken that these bulbs are not kept too warm at first. If possible, keep them in a bedroom or parlor where they will not freeze and yet be warm.—*Chatta Bella in Post and Tribune.*

KEEPING FLOWERS.

A great deal has been written on the preservation of cut flowers, but the matter is still imperfectly understood by most people. It is important to know, not only how to take care of them after being cut, but how to cut them. On this latter point a practical hint may be of service to our readers. It might not occur to them that it made any serious difference whether the stems were broken off or cut with a knife or scissors. A sharp knife is the right tool for the purpose, as it leaves the sap vessels of the stems open for the absorption of water, while scissors crush and compress these vessels so that their absorptive power is more or less destroyed. Like injury may be done in breaking off the stems, especially if they are tough. If the flowers are put into water immediately the ends of the stems should be cut off with a sharp knife, as the sap vessels will probably have become clogged up with coagulated matter.

Cut flowers often suffer from too dry atmosphere. It is difficult to avoid this in our artificially-heated rooms, but we may at least put the blossoms in the coolest part of the room. Near a window, and especially in a bay-window, the temperature is generally several degrees lower than in other parts of the room, as you will see if you will test it with a thermometer. The best authorities say, moreover, that the flowers should have the benefit of light, and even of sunshine in most cases, though there is popular prejudice against exposing them to the latter. On the other hand they suffer, as plants do, from draughts and from sudden alterations of temperature.

Botany also furnishes us useful hints for prolonging the life of many single flowers. This may be done by removing the anthers, for when the pollen on these becomes ripe the stigma gets impregnated, and the flower having fulfilled its natural destiny, drops its petals and withers. In the case of blossoms that fall to pieces very easily, it is a good idea to let fall a drop of gum or mucilage into the centre, which will glue the petals together at the base. To prevent this from running out, before it hardens, the flowers should be kept upright by putting their stems through the bottom of a sieve or sticking them in sand. With the aid of a camel-hair brush or a pointed stick a large number of flowers may be gummed in a short time.

When flowers have been carried a long distance in close boxes or cases, they often appear withered and worthless, but with proper treatment they may be revived and restored to their original beauty. Instead of being at once put into vases and exposed to the hot and dry air of the parlor, they should either be spread out on wet flannel or moss and covered with a dish cover or an inverted box, or else put in pans containing moss and water or wet sand, in which they can be set upright, and then shut up in the dark for a few hours. If they do not regain their freshness under this nursing, there is no hope for them; but in all ordinary cases their recovery is certain.—*Journal of Chemistry.*

SINGLE AND DOUBLE FLOWERS.

An English writer quoted by Mr. Vick strikes directly at a plain truth in regard to changing some of our beautiful single flowers into double ones without in the least improving them. He says: "Although durability is a very desirable property, and one that, when writing upon the subject of flowers for cutting, I have before urged, still it would be a mistake to attach more importance to it than it deserves, and to lose sight of the fact that single flowers have an elegance about them which double ones are always deficient in. This to me was never more apparent than in looking at the double varieties of *Cineraria* that have recently made their appearance. There is now the manifest mistake being made of ranging under the florist's standard and bringing within the florist's code of properties every flower that is sought to be improved or altered; indeed sometimes the alteration lacks improvement.

"The day for this has gone by, for if there is one thing more than another now apparent, it is the perception and appreciation of simple beauty in natural objects, flowers included, by the majority of the people."

THE OLEANDER.

Mr. Shirley Hibbard says: "This handsome shrub is one of the most poisonous of its class, and therefore should be handled with care, for if the hand is cut when pruning it a dangerous wound may be the result. In Dr. Hogg's 'Vegetable Kingdom' occurs the following respecting it:—'It is one of the most beautiful window plants when covered with its large, rose-like blossoms; but in these blossoms the weapon of death resides. During the Peninsular war a number of French soldiers who went out foraging near Madrid returned laden with the fruits of their search. One of the number, with the view of securing some wood to make skewers for the meat, cut a quantity of oleander boughs, and, having stripped them of the bark, used the wood in the meat. The result was that out of twelve who ate of the roast seven died, and the rest were dangerously ill. The poisonous principle is so subtle that its exhalations alone are sufficient to cause serious accident, and even death, to those who recline or sleep for any time under their influence.'"

It may be added to what Mr. Hibbard says, that the stories we have in all modern botanical works about azalea and rhododendron of modern botany yielding poisonous honey is purely fictitious. The oleander was the rhododendron of the ancients, and when the name was transferred to our present plants, the poisonous reputation went with the name.—*Gardeners' Monthly*.

A BEAUTIFUL WINDOW PLANT.

Blue is a color which we seldom find among suitable window plants. Recently, however, there has been introduced a species of *Torenia* (*T. Fournerii*) which makes one of the best plants for the window culture there is of this or any other color. I have only had the opportunity of growing it for one season, but during that period it has gained much favor in my own estimation, as well as in the opinion of every one who saw it. It is of dwarf compact habit, growing about 8 or 10 inches high. The flowers, which are a dark blue

color, with a yellow spot on the under lip, are produced in such numbers as to form a perfect bouquet of two colors, which form the greatest contrast of any there is to be seen in flowers blue and yellow. The leaves are of a dark green color about an inch long, but few of them being seen for flowers.

Some people may object to this plant, owing to its being annual, for growing in the window, but as it is easily raised from seed, can therefore be purchased at low rates, and will produce its beautiful flowers in abundance for at least a year if the same attention be given it as required for the welfare of a geranium. I had only a limited number of plants for sale last spring, but to show the demand for them they were all sold within a few days after the first plant came in flower, with the exception of what I kept to produce seed and try how they would succeed as window plants and for bedding purposes.

Grown in light soil, it makes a beautiful plant for the flower garden, growing more luxuriantly than in pots, but producing flowers as abundantly. The seeds are small and require to be carefully treated to get them to vegetate without damping off, which they are liable to do if kept too wet. As soon as large enough to handle, the plants should be transplanted around the edge of 4-inch pots, where they can grow until large enough to put into small pots. Leaf mould, with considerable sand well mixed through it, is the best soil for growing it in.

Of the hardiness of the plant I cannot definitely say, but a plant which had been growing in a cool window was left out of doors two nights in succession when the thermometer registered 30°, and received no injury, demonstrating that it will endure with impunity as much cold as a geranium.—*M. Milton in Practical Farmer.*

TREATMENT OF CALLAS.

A writer in Vick's Magazine gives sensible advice on the above topic: When done flowering, callas should be turned from the pots and planted out in the garden rows of vegetables, and cultivated the same as potatoes, being sure to choose a sunny situation and to keep them free from weeds. In the fall, about Sept. 15, take up and pot in rich soil containing one-fifth sand. The pots should not be too large—simply large enough to conveniently contain the roots. Many persons will place their Callas in wooden pails, and wonder why they will not bloom. The fact is, to produce bloom the plants must be pot-bound. Plenty of sand is to secure drainage—for this plant requires a great amount of water, and it should percolate the entire mass readily. After taking up and potting, place in the shade for eight or ten days and water sparingly. About middle of November begin watering with warm water, increasing the temperature each day until the water is hot but not scalding. Pour the water on the earth, but not on the stalk. Don't be sparing of the water at any time save just after potting. This will make it bloom about holidays. A south exposure is best, as it delights in warm sunshine. Sprinkling with warm water often in winter destroys red spiders, and sponging removes dust. We saw a Calla treated as above last winter that had seven blossoms on at one time, and twenty during winter.

LIQUID MANURES FOR PLANTS.

A Baltimore florist, in *Journal of Chemistry*, is responsible for the following plan of getting liquid manure: Put one bushel of horse clippings from the blacksmith's into a barrel and fill with water, allowing it to stand for a week, when it is ready to use with a watering pot on potted plants. Plants under this watering grow very strong, although at first the results are not promising. It makes large, handsome flowers, and plants can remain in very small pots for a long time under this treatment. This is of interest to the market gardener, who can secure thrifty plants that occupy small space and will command a good price.

EXHIBITION FLOWERS.

Flowers at fairs throughout the country have never been better shown than by James Vick, of Rochester, and we take the liberty to abstract from an article written by him upon preparing and caring for flowers to be exhibited: Common market baskets are best to carry them in. First place a layer of sphagnum in the bottom of the basket, very slightly moist. Flowers that can be cut with long stems can be gathered by the handful and set upon the moss until the basket is full, then cover with stout manila paper, from which a piece has been cut on either side to accommodate the basket-handle; this is securely tied and the basket can be carried a long distance with safety. It is always best to cut flowers in the morning, before the heat of the day. Dahlias should be carefully labeled when cut (wooden labels are best), and set thickly together in the moss. Pansies are cut and placed in thumb-pots partly filled with moss, and moss placed about the stems to hold them in and the pots placed in the basket of moss. Gladiolus spikes are cut by the handful and set in the basket with the cut end of stems in moss; these may be carried without covering. Close-headed flowers, like zinnias and dahlias, require more space than loose, open blossoms, as unless they have plenty of air the leaves of the flowers damp off. Care should be taken not to let the baskets stand in the sun at stations on the route. Experience has taught that the best way to arrange flowers at a fair is upon a bed of sand two and a half inches deep, and a very pleasing effect is produced by having green moss from the woods upon the sand bed for a ground work. Tall spikes can be shown in fruit bottles. Sometimes a rail is placed before the exhibit for protection; if this be covered with evergreen twigs and boughs it will conform in style to the moss-covered tables.

LANDSCAPE GARDENING AND ARBORICULTURE.

HOME SURROUNDINGS.

The following from the *Michigan Homestead* is a fitting extract into which to open this division of the Portfolio:

The door-yard and surroundings of the house deserve a passing notice. Frequently one of the first improvements the young wife makes is to get a little

corner in front or beside the house, where she can grow a few flowers—pretty emblems and tender reminders of a happy girlhood. She would grow them here that her new home may prosper with the peace, love, and contentment which their beauty and fragrance betoken. Alas for her dreams! No enclosure protecting the door-yard as it always should, therefore none of the pleasant ornamentation of lawn, shrubbery and flower bed. Some stray cattle browsed off the tender leaves of her plants, and that bane of the farm-yard society, and curse of the table provender, some unregenerate hogs in their deep rootings after knowledge their brains will never contain, nor their meat nourish the body of man, have spread devastation in this restful pleasure ground of the wife's diversion. How often we disregard the "external fitness of things." Frequently the house looks out upon the cattle-yard, and many times the multifarious odors from a too convenient pig-sty regale the senses, as you would enjoy the cool breezes on the front porch at noon or in the evening. Again as evidenced by a total disregard of the topography of the grounds as suitable for building purposes:

The barns situated on a commanding rise of ground, and the house a couple of hundred feet distant on a lower level—thus rendering impurity of water liable, and damp and unhealthy cellars common sources of contagion. Again, perhaps the house is buried in foliage. If "paint costs nothing," sunshine costs less, though a finer pigment and allied to cheerfulness. The house dark, damp, and cheerless, and the atmosphere of the home in keeping. And yet avoid the other extreme, no shade, no trees; the broiling sun in the summer bakes it, the wintry winds, whistling, play a requiem to the happy name of home. We dwell upon these errors, sure that they arise from a too severe practicality; from a narrow and unenlightened view of life and its requirements.

AN OBJECTIONABLE PRACTICE.

To our view, the beauty of the surroundings of many country homes is seriously marred by the very common practice of cutting off the lower branches of the trees so as to expose a bare trunk from eight to fifteen feet in height or more. This is especially detrimental to the appearance of evergreen trees, whose beauty in a great measure depends upon a full growth of their lower foliage, even though it rests upon the ground. Deciduous trees, however, when thus cut up, have the look of being held up in the air, while the grounds are robbed of that shady, verdant fullness, which is so essential a part of landscape beauty. A forest viewed at a distance is grand. The tall, naked trunks are in keeping with its extent. But to those who seek the woods for pleasant walks, the smaller trees, the shrubs, the undergrowth, and not the tall trees, are the immediate objects of interest. To cut off the lower branches of trees is to remove the tree out of—above the lawn, while the rude stems are alone left for ornament.—*Rural New Yorker*.

ROADSIDE TREES.

Our opponents say that shade along the public roads tends to keep them constantly wet and muddy; that the roots take too much nourishment from the adjoining fields, beside other minor objections. So, too, the farmer who dislikes orchards as shading good ground, and that robs the owner of so much

good soil for potatoes or grain. A similar fault is attributed to the few ornamental trees around the dwelling. I can only say in answer to such arguments, that if we must sacrifice everything in this life to the purely practical, and grow nothing but what returns an equivalent in hard cash to one's pocket, then it is useless to carry the controversy any further. But under the conviction that trees and flowers were given to us for a good purpose, no less than for us to enjoy in our every-day walks, not only in our woodlands, but around our homes, and according to my method of arguing, along the roadsides where the traveller may be sheltered from the sultry summer sun. As to the objection relating to muddy roads, this can only be the case in clayey, retentive soils, and our farmers well know that during the spring "stone-picking" there is always an abundance of small stones that may be dumped in the road, and thus in time be made to answer a two-fold purpose—clearing the fields and macadamizing the highway. The advantage to be derived from cool, refreshing shade during the summer months is beyond all description; all that is needed to make converts is to test the two extremes in a practical manner, when I think the question will be settled finally in the affirmative.—*New York Tribune*.

FRUIT TREES BY THE ROADSIDE.

The planting of forest trees by the highway for shade and ornament has been common for a long time, but few years comparatively have passed since the use of fruit trees for the same purpose has been found practicable by a limited number of our most sagacious fruit-growing farmers. With few exceptions, however, during the last decade, as the cultivation of the apple has advanced, in nearly the same ratio the apple-tree has been planted by the roadside, not merely for ornament—although that of itself should be sufficient inducement—but for profit. And now since the highway laws of this State prohibit the running at large of all farm stock, I know of no reason, with judicious planting, proper care and culture, why we cannot expect as good returns from the outlay as though our trees had received the common old-fashioned field culture. One important requisite with regard to roadside trees, where ploughing or cultivating the soil is not practicable, is a thorough mulching with a liberal supply of straw, coarse manure, muck, or any substance that will tend to check all growth of grass, weeds, etc. Indeed, my own trees, two years from planting, thus treated, have made a growth that would compare favorably with those under ordinary culture. And the fact that in an adjoining county, during the past season, could have been seen long lines of apple-trees skirting the highway on either side, heavily laden with the choicest varieties of winter fruit, should dispel all doubts from the mind of the most skeptical as to the practicability or profit of fruit-growing in this economical way. Then let us plant trees, not confining our efforts to the winter varieties alone, but include many of the earlier and later fall kinds, that there may be an abundance for all to partake of as they pass along, and many in after years will rise up and call us blessed.—*Irving D. Cook, in N. Y. Tribune*.

LANDSCAPE EFFECTS OF WOODLANDS.

Besides the economic use of woodlands left for timber and their practical value as wind-breaks, they have another use of hardly less importance. I mean

the power they possess of adding beauty and diversity to the landscape. How dull and tame any landscape, even in a picture, without trees. As trees, either single or in groups, add to the beauty of a lawn or park, so forest trees, either in groups, masses, or wide areas, add to the beauty of more extended landscapes.

One of the pleasantest views I have ever seen is that obtained by looking across Nunda Valley, in western New York, from the east. As the farms rise gradually on the other side, the blocks of forest that have been left for timber are clearly outlined in the midst of the cleared fields, and the whole valley, with its thriving village embowered in trees in the center, forms a most interesting and beautiful picture. There are some very pleasant views in Oakland, Jackson, Washtenaw, and other counties in our own State. Whenever the surface is at all uneven or hilly, the tracts of forest that have been left stand out more prominently, and give to the landscape a very pleasing diversity.

No farm should be improved without leaving at least one-fifth or one-sixth of the original forest for timber. Long strips are best for wind-breaks, but have a less pleasing effect to the eye than more compact masses. They cut off any extended view, and if the timber is thin, the long, narrow strips have a ragged appearance. In case the original timber is very scattering, it is well to cut out all the large trees, leaving the second growth to take their place. This makes the mass symmetrical, and by judicious thinning it can be kept even in growth, and made more and more beautiful as time develops the natural characteristics of each individual tree.

The landscape effect should be kept in view in leaving trees for shade upon the farm. A single group of a dozen trees in each field is better than a dozen single trees scattered about in different places to interfere with the working of farm machinery. If possible, it is well to leave a group in the corner of each field where four fields join each other. This makes a nice grove, and takes up but little room from each field.

We are clearing up our forests too close. The practical farmer is too apt to admire large fields without a single obstruction to the working of his self-binder and other farm machinery. But the time will come, even here in Michigan, when we shall dread to see large areas without a single group of timber. It seems a crime to utterly destroy the rich heritage that nature has given us. We are apt to speak with pride of the progress we are making in the subjugation of a continent. Too often, I fear, we are robbing it of wealth that no effort of man can ever restore.

In thinking of those old French voyageurs and explorers who first trod the shores of our great inland seas, I envy them the pleasure they must have had in wandering through the natural parks of this great continent, where man had not destroyed a single tree—where virgin forest alternated with grassy prairie in an endless succession of beautiful scenes. But these natural beauties are gone forever. It only remains for us to preserve a reasonable amount of the forests that yet are left to us, and study how we may improve the surroundings of our homes by the judicious planting of trees, that seem so glad to reoccupy the soil from which their forefathers have been ruthlessly torn.

It seems a mistake, much to be regretted, that in the location of the capital of our State, that not a single acre of the grand old forest, abounding in giant oaks and elms and walnuts, was left as a sample of what the soil there once produced.

If it were yet possible, a whole county in the northern part of the State should be reserved and left as a natural park, to remain inviolate from the

destroying ax of the settler and lumberman, and sacred only to the lover of solitude such as only the forest primeval can give, and to the lover of a landscape which the hand of man has had no part in developing.

JAMES SATTERLEE.

Greenville, Michigan.

ORNAMENTAL DECIDUOUS SHRUBS.

This delightful paper was read before the Ingham County Horticultural Society by Mrs. D. L. Case :

Shrubs are generally distinguished from trees by having many stems. Shrubs which are most commonly known and the cheapest are usually the finest varieties, or at least have the greatest number of desirable qualities. The question is asked, "what are the most essential shrubs for home embellishment?" Before answering this it is necessary to know something of the place to be embellished; whether large or small, isolated or connected with others; whether the shrubs are to be set as single specimens or grouped in masses. There are certain qualities that will apply to all shrubs to make them desirable for well-kept grounds. (1.) The most essential is that the foliage be so luxuriant as to cover the branches. (2.) That they put forth their leaves in early spring and retain their foliage late in autumn. (3.) That the flowers be conspicuous, of pure color, and preferable if fragrant. (4.) While they maintain a shrubby character they should be free from a suckering habit. Still, there are some varieties, such for instance as the lilac and flowering currant, which have this bad quality, and yet are indispensable for their many good features.

Now, if we bear in mind these most essential qualities and look over any good list, we shall find the tartarian honeysuckle, snowball, syringas, dentzias, and lilacs approximate most nearly to perfect shrubs. Enthusiastic amateurs as well as professional gardeners hail every change with delight, not because they are more beautiful, but because they are novelties. Many would be surprised to see the beauty of the lilacs when they have a fair chance to grow. Our poet Longfellow has his home at Cambridge ornamented with clusters of lilacs, well cared for, and the native elm. So simple, yet a fair index to the man's character.

While the number of ornamental shrubs is great and constantly increasing, yet we should rather seek a few of those that grow vigorously and bloom freely than to make a collection of a great variety. Very little satisfaction can be gained from a great variety by an amateur, as many of these possess no distinctive character, however curious and pretty they may be to the botanist. In all grounds a well-appointed, well-arranged shrubbery is a most effective feature, and in grounds of small extent, such as the front yards of city lots, the use of shrubs or trees of small growth are preferable to those of spreading habit. In lawns just enough of large trees should be planted to form sufficient shade, leaving the effect and general impression of beauty to be produced by the proper arrangement of shrubbery.

To obtain the best effect, care should be exercised in regard to the color of foliage. In other words, we are well aware that some shrubs have dark green leaves, some light, and some a yellowish tint. Shrubs whose leaves are of a gray or bluish shade when seen over or between those of yellowish or bright green will seem to be thrown into the distance; thus the effect of perspective

may be considerably increased by proper attention to this matter. "A shrubbery," says Mr. Phillips, "should be planted as a court or stage dress is ornamented, for general effect; all harshness should be avoided." By a judicious mixture of shrubs whose colors will blend easily with one another and with evergreens they can be so arranged as to give a pleasing effect. Some recommend (I think Downing is one) that we should not only notice the color of the leaves, but also the color of the bark, which will be so varied as to make a pleasant study in winter when the leaves have fallen. The English make great account of the bright green leaves and red berries of the holly for their Christmas decorations. We in this northern climate find it too cold for the holly, but we have some kinds of shrubs that have red berries which are very pleasant to see and furnish food for the birds that prefer to remain with us in our cold weather instead of migrating south, thus teaching us another lesson from God's word,—that God careth for the birds.

Many of us would be surprised to know how many kinds of beautiful shrubs grow wild in our own woods. I think I am right in saying there are thirty kinds of spirea that grow wild, and the dogwood, boxwood, high-bush cranberry, June berry, and many other really beautiful and desirable shrubs, such as we buy of our enterprising gardener, with high-sounding names attached, little thinking we might have had the same without money and without price by transplanting from our woods. Our common sassafras is a beautiful shrub, with umbrella-shaped top and curious leaves, and in autumn gorgeous in color.

No garden should be without a good selection of ornamental shrubs. To have them yield the largest results, they must be carefully planted in a suitable position. They increase in size and beauty year by year. The time of flowering extends over the whole season from April to November, if properly selected, although the greatest show is in the spring. The earliest is the fragrant flowering currant, followed by spirea, Japan quince, and many others. The calycanthus, mock orange, and many others fill our yards with fragrance. The later varieties, such as lilac, tartarian honeysuckle, etc., should be set farthest from the street, or so arranged as to form little vistas for out-looks from the front door or windows of the house to the street. Many of our most desirable shrubs are brought from Japan; among them the shrub hydrangeas, which are small, but perfectly loaded with large spikes of flowers, very striking in appearance; they blossom in August, and if well manured will last to bloom more than a month. The first I ever saw were in Philadelphia during the centennial year. I made many inquiries before I learned the name to be "*Hydrangea Grandiflora*." Since that time several other varieties have attracted my notice, all very desirable. In September the altheas make our lawns bright with flowers. It is true, if set in the foreground, as they sometimes are, the flowers look coarse; but there is a place for everything, and everything should be in its place. "Order is heaven's first law." Altheas can be planted in clusters or singly; they make a very pretty round-headed tree if planted singly, which I prefer. The list which I have gathered as the most desirable is as follows: Gardoni or flowering currant; Japan quince, both scarlet and white; spirea, many varieties; snow-ball; lilac; dentzias, white and purple; fringe tree; wygelias; altheas; hydrangeas; tartarian honeysuckles; and last but not least our beautiful roses, from the deepest crimson to the purest white, and the perfume passeth all understanding. As in other shrubs, so in the rose there is great variety; but as in others, we can obtain the really desirable ones in comparatively small numbers.

No garden is complete without its bed of roses. We can have, if we prefer,

the hardy hybrid perpetual; but to have roses from June until November we must have the ever-blooming varieties. They are tender, but by protecting them they will live through most of our winters, and if some of them do die there is a firm where we can replace them for very little more than we pay for verbenas, which cease to bloom nearly as soon as the frost comes.

I have a bed where I can pick more than a bushel of roses at one time in June and never miss them. To appreciate their delicate beauty we must watch their unfolding day by day. Among the most attractive are the Caroline De Lansal and Gen. De Tonquil. These two alone would well repay the care and expense of the whole bed with their rare beauty.

FRUIT TREES IN PLEASURE GROUNDS.

We do not consider the orchard as in its most appropriate place when situated in the front yard, still a judicious use of some of our most ornamental fruit trees upon pleasure-grounds may add greatly to the artistic effect of the grouping. A correspondent of the London Garden gives some valuable hints upon this subject, which we epitomize. He says that in Germany the lawn between the fruit garden and the pleasure-ground is by no means a definite one; often fruit trees and shrubs are intermingled with the ornamental planting, and results prove there is much to recommend the practice. The rather cheerless aspect of groups in early spring is relieved by the delicate blossoms of our early fruit trees; and when these trees come to be laden with rich fruit, if the groups are so arranged as to have a back-ground of sombre evergreens, there is nothing more pleasing to the eye than the delightful contrast. The writer says: "I have a vivid recollection of once standing upon an eminence in the vicinity of the Vosges mountains, from whence seventeen villages could be counted, each embowered in fruit trees, and lying snugly in the valleys surmounted by hills, clothed with lines of somber hue, the whole forming a scene worthy of the most gifted painter's brush. In the palace gardens of Ludwigsburg there are whole avenues of fruit trees, which, so far from appearing misplaced, rather seem to add to the attraction of the place. It is certain that there are many situations in gardens in this country, such as in the wild garden, the shrubbery, or the half-annexed portion of the pleasure-ground, where a few fruit trees might be introduced with pleasure and profit to the owner."

MAKING LAWNS.

To properly make a lasting lawn, and to keep it in good order, taxes the highest skill of the horticulturist, and when well executed, is the masterpiece of ornamental gardening. Without it all other improvements look insignificant. It forms the green carpet upon which all ornaments are to be placed, and its bright verdant hue imparts beauty to all.

Instructors upon lawn making generally advise subsoiling the ground. If this be done, it should be a year previous to laying down the lawn. It is not always best to do it, as the subsoil may be a stiff clay, or barren sand. I have seen subsoil brought to the surface so poor that not even beans, peas or corn would grow,—the germs rusting and decaying away. The seeds of grasses

are small and succeed best in mellow and fertile soil. Several species of grasses should be sown, and very thickly, to make a close, green turf: red top or herd grass, blue grass, orchard grass, and a little white Dutch clover. The land should be manured the previous year to sowing the grasses. After digging or plowing, harrow or rake fine, level up all hollows, and roll firmly down. Then sow the grasses, rake fine or harrow, then roll again. The sowing time will be according to climate and latitude. Between New York and Baltimore, say from early March to middle of May, and from early September to early in October, and all the fall after that. When grasses and weeds are well up, roll well, and let them all grow until the earliest weeds shoot up flower stalks, then mow down with the scythe or horse mower, and scatter the cuttings evenly over the surface. When they wither, roll again, and then rake all off. On sandy lands the summer mowings should be seldom. On sloping lands and terraces or banks, the grass should be let grow long in hot, dry weather, unless artificial watering is at hand.

The lawn should not be weeded the first year, but cut down all weeds when they bloom to prevent them bearing seeds. Weeds may all be taken out in late fall, and more grass seeds sown. Men with table knives can get out a vast number of weeds in a short time. A thorough digging out of weeds, with table knives, will keep the lawn nearly clean. Do it in late fall or early spring. The lawn should be firmly rolled down every spring. It is good to sow some more grass seeds in late fall or early spring, so as to ensure a close turf the next summer.

Barley manure, so fermented and rotted as to kill all seeds of weeds in it, is the best fertilizer. It should be spread equally over the surface in fall or winter, as salt is a most excellent fertilizer, when applied at the rate of five to ten bushels to the acre. Marl mixed with plaster of paris is beneficial on sandy lands. Guano, and all the concentrated fertilizers are good, but their effects are different upon different lands. Lime, wood ashes, and stone coal ashes should all be compounded with soil a year before using, and spread over the lawn in fall.—*Walter Elder in Gardeners' Monthly.*

WEeping TREES.

Wier's cut-leaved maple is one of the most desirable lawn trees we know, and we were not aware of its weeping habit until this season. When we tell our readers that it is nearly as strong a grower as the silver maple, from which it is an accidental seedling, while the branches have the graceful droop of the weeping willow, or the beautiful weeper, the cut-leaved weeping birch, while its leaves are delicately cut and fringed, making as delicate net-work as lace and of a pleasing silvery green—they may imagine what a beautiful lawn tree it must be, as it is a strong grower, perfectly healthy and hardy. We call the attention of all those who wish to embellish their lawns, to this charming tree, which we consider one of the greatest acquisitions to our list of hardy ornamental trees that we know. Every one who has room for it ought to have it. It buds readily upon the common silver maple (*Acer Dasycarpum*), but as the buds are very small, it needs a careful and delicate hand to insert them and carefully tie them.—*Coleman's Rural World.*

CHINESE YAM FOR ORNAMENTAL PURPOSES.

Mr. E. S. Carman, in the Rural New Yorker, speaks of this plant as follows: "The growth of the stem from the time it appears above ground until about June 10, is remarkable. It is like a purple rope without leaves or leaf appendages of any kind. The 'rope' attains the height of from ten to fifteen feet before the buds push, living meanwhile upon the nourishment stored up in the root, being a biennial in its nature, the same as the carrot, beet, parsnip, turnip, dahlia, or sweet potato. We mention this because it has often been stated that the Chinese Yam increases in size from year to year, whereas the Yam of one season dies during the next. In early June lateral buds push and the stems soon become wreathed in foliage. It is well to pinch the leading buds if a closer growth of foliage is desired. Respecting the rapidity of the growth of this vine, we may say that several years ago we tied a string as a mark and found by exact measurement that in twenty-four hours the stem had grown eight inches. The flowers are borne in delicate racemes and emit a pleasant cinnamon fragrance, from which circumstance an enterprising individual, several years ago, sought to introduce it as a new plant under the name of 'Cinnamon Vine.' By this name it is still known in many places. In the axils of the leaves little tubers form, which may be described as resembling miniature Early Rose potatoes. After the first frosts, these fall, and if buried in the earth, will sprout the ensuing spring. Or they may be collected and kept through the winter the same as potatoes. The plant is diæcious. We have in this country only the male, so that true seeds never form. It seems odd that, in view of its beauty, the female has never been introduced, so that we might hope to raise seedlings of different varieties."

THE TULIP TREE.

Of the widely disseminated native, the tulip tree (*Liriodendron Tulipifera*), which the late A. J. Downing regarded as "decidedly the most stately tree in North America," which others have called beautiful, which is variously known as poplar, white-wood, tulip tree, Virginia poplar, saddle tree (from the truncate shape of the leaves), canoe-wood, etc., which has exceptionally attractive foliage, fragrant tulip-shaped flowers, wood durable and useful for many purposes, and root-bark of tonic properties; Mr. E. S. Carman says that, contrary to a general opinion, it is not difficult to transplant, as he has known hundreds removed with as little percentage of loss as in the case of the sugar maple.

"To be successful in transplanting the young tulip, however, not only must the secondary branches be cut back but the entire stem to within two or three inches of the neck must be cut away so that the roots and neck are all that remain to be transplanted."

As to rapidity of growth, it is remarked that from roots thus transferred from their native ground in early spring, trees not less than fifteen feet high can be counted upon in five years. Mr. Carman thus set one within twenty feet of the house, to produce a quick effect on a new place. Of results thus far, and under the unnatural treatment of the pruning-knife, this is given.

The third year it had made a growth so considerable that we were called upon to decide whether it should be cut back or removed, and the former alternative was adopted. It has been cut back yearly since with the result that we

prized it last summer as one of the most beautiful lawn trees we have ever yet set eyes upon. The leaves are twice the size of those which grow in the woods and are perceptibly larger than those which grow upon trees of the same age under cultivation when not cut back. Besides, the annual pruning has forced the growth of many lateral buds which would otherwise have remained dormant, so that the tree from spring till late autumn is a mass of luxuriant foliage which entirely conceals the branches, and is most pleasing in its refreshing shade of green and firmness of texture during summer, and in its golden hues of fall. We are of those who believe that, as a rule, all pruning impairs in a greater or less degree the vigor or longevity of plants, though not, perhaps, appreciably so in many cases. How long our Tulip will remain healthy under this treatment remains to be seen. We are impressed, however, that the development of several branches by pruning, in the place of one branch when the tree is permitted to grow naturally, may change its size from one of the first magnitude with an erect, columnar trunk, to one of comparatively dwarf dimensions; in other words, that the vigor which in the woods is expended in the growth of a colossal main stem, is by cutting back distributed among a greatly increased number of lateral branches and leaves.—*N. Y. Tribune.*

THE ROSE OF SHARON.

Not much like our ideal of the queen of flowers is the Rose of Sharon or *Althea*. It is neither sweet-scented, graceful, nor particularly exquisite in color of flower, yet it asserts and proves its value very thoroughly in its own way. If not graceful, it is straight, sturdy, and vigorous, demanding for itself a prominent position on the lawn, somewhat away from other shrubs, with which its pronounced individuality does not readily blend. The flowers, if somewhat coarse, are bright and cheerful and very welcome in August, when the lawn is especially destitute of bloom. To me the most attractive althea flowers are single ones. The purity of outline, simplicity and wealth of color of such altheas are very attractive, particularly in an entirely white variety, which is still quite rare. Altheas seldom receive intelligent pruning. One generally meets monstrosities in this genus, for the very good reason that pruning, as applied to altheas, is seldom pruning, but merely trimming or clipping. Instead of removing only a few inches of new wood from year to year, the pruning knife should boldly cut back into the old wood, within a foot to three feet of the ground, according to the size and age of the specimen operated on. This should be done systematically, in winter or early spring, and not in June, as in the case of early flowering shrubs, for the reason that altheas bear their flowers on wood produced in the current year of flowering. The result of such management will simply be a bush, well clothed with leaves and flowers from base to stem, instead of comparatively naked stems, with leaves and flowers chiefly at the summit.—*S. Parsons, Jr., in Country Gentleman.*

PICTURESQUE TREES.

The most sensible remark I have heard about trees was by Sir Charles Ishaw, who replied to one who was regretting that the snow had broken off

some of the branches of his Cedar of Lebanon, "A good thing, too." We want more light and shade in our trees, and we should never be ashamed of them when they get old. We have the finest trees in the world, the only drawback being that when one gets a little broken or in any way decrepid from old age, we are in too great a hurry to get rid of it. But our woodland pleasures would be increased by leaving here and there a fallen tree, or an old tree stricken in years, even if it does lean before the blast. I never felt the beauty of a larch wood until I saw one near the snow line in the Alps,—some of the trees dashed over the precipice, but still holding by the roots—others, blanched and dead, standing among the living trees with beautiful green buds.—*London Garden.*

A GREEN CARPET UNDER TREES.

Many owners who have enjoyed a fine green carpet of grass under the young trees on their lawns or dooryards, are greatly disappointed when the trees are older and spread their branches to a greater extent, to find that the grass has died out, and a bare surface or a poor growth of moss has taken its place. All attempts to restore the grass by re-seeding have proved fruitless. In such cases the English ivy may be employed to advantage, and after the ground has become covered with its running stems and green leaves, it will remain permanently green summer and winter. This plant is not wholly hardy as far north as 42°, when exposed on buildings and walls, an occasional severe winter cutting it down; but when prostrated on the ground or under trees it is never injured.—*J. J. Thomas.*

CARPET GARDENING.

This matter of carpet bedding is carried to quite an extreme by French ladies, and in it they find a wholesome source of recreation, and a means of exercising artistic taste. It consists in laying out strips of lawn in flower borders, copying colors from the shades of a rich Persian carpet or Indian shawl. It involves not only a thorough knowledge of colors in the various foliage plants, but accurate information concerning the forms and habits of growth of plants. When the beds are fitted for planting, a paper perforated with holes indicating the design is laid upon the ground and powdered chalk sifted through, which leaves the impression of the design upon the dark mould, and labels are stuck in to indicate the plants to be used in completing the work of art.

GARDEN DECORATION.

The London Garden makes a capital hit on the tendency to mix up statues and all-shaped metal and wood forms with plant life, which we are disposed to reproduce as applicable to many places in our own country: "Among the various kinds of garden decoration which one sees in other countries, perhaps one of the least desirable is the German one of mixing up hard and 'flourishy'

art with plant life. I have seen some very good gardens in Germany, but their floral decorations, especially as illustrated in some of their books, are simply terrible. Ultra delight in poor Mosaic gardening, brazen women and brazen bulls with rings and wreaths, mixed up with fair flowers, showy pedestals, contorted trellises, rustic work in impossible and paralytic positions, a delight in anything but the plants—poor sticky rubbish; little palms stuck in pots and vases decorated like a hideous coffin.”

THE ALTERNANTHERA AS A LAWN PLANT.

A carpet-like effect may be produced with the alternanthera on a smooth lawn in the following manner: Cut strips or figures out of the turf of any shape determined on, from three to four inches deep, and in width considerably narrower than the width of the ordinary mowing machine. The object of restricting the width of the shallow pits is, that after they are occupied by the proposed plant the hand mower may be forced over the lines or figures without falling into the sunken space and crushing its contents. The plants should be of good size when set in the ground, that the narrow space allotted them may soon be filled up, and, in order to maintain a distinct outline, the alternanthera should be planted near the sides of the pit, thus preventing encroachments from the grass and at the same time admitting of free growth upward and inward toward its center. The earth in the pits, if of too close a character, should be removed to a depth of from six to twelve inches and replaced with a more open soil, otherwise the plants might be liable to injury by water remaining around them after heavy rains.

The lawn run all over with tortuous lines but a single plant in width would furnish an attractive arrangement, or the decoration might be of spots and figures of small size, each figure or spot requiring from one to as many as six or eight plants.

In a general way, the alternanthera varies considerable in color, and this variation may be made use of to greatly increased effects.

With some planning there may be several suitable styles of ornamental treatment. I have some drawings exhibiting the alternanthera in the pits and the grass on either side trimmed down by the machine to an equal height. Still another section shows a band of alternanthera on the lawn, and a second band forming one of a series of ribbons of foliage plants, this latter starting from the grass line and being rounded upwards until it touches the adjoining ribbon. These suggestions are, of course for the amateur; the professional gardener will follow his own fancy.—*M. Digram, in Gardeners' Monthly.*

THE SCHOOL GARDEN.

We wish that teachers and school officers would read and put in practice the hints given in the following capital description of a school garden, given by T. H., in *Vick's Magazine*:

The grounds comprise two acres. Three-quarters of the area is occupied by building and play-ground, the remainder being given up to flowers. A simple wire separates the flower-garden from the play-ground, as a boundary line; this

is not intended as a barrier, but as a simple definition of limits, the disposition to trespass being left entirely to the honor of the pupil. The pupils are told in spring-time that the flowers are cultivated for their pleasure and profit, and not to be picked without permission—no further admonition is required.

We had a fine collection of flowers, including the choicest varieties of Geraniums, Heliotropes, Gladioli, Tuberoses, Verbenas, Pansies, Asters, Balsams, and Tea Roses, which we cultivated with best results. Our garden received the second premium of the county at the agricultural fair; the first on Gladioli and the second on Pansies.

We tried our skill at a foliage bed. The bed was circular, twelve feet in diameter; Castor Bean plant in the center, and filled up with *Amaranthus*, *Perilla*, and *Centaurias*. The *Perilla* with its dark, deep-fringed, chocolate-colored leaves, contrasting with the white, silvery *Centaurias* on one side, and the scarlet-crowned, tri-colored leaves of the *Sunrise Amaranthus* on the other, makes as elegant and showy bed as one could desire. Our school boys called this "the boss foliage bed of the town," and so pleased were we with our success that we have decided to make greater efforts the coming season.

FLOWERS IN THE SCHOOL-ROOM.

We recently visited a school-room in Alameda county where there were blossoming vines of *Maurandia* in pots in the windows, together with yellow and scarlet *Tropeolums*, and boxes of Pansies, while two hanging baskets of *Lobelias* and *Coleus* made the room look much more pleasant than the average school-room. It was told us in strict confidence that the total cost of this flower display was twenty cents for Pansy and *Lobelia* seed. The rest of the plants were raised from cuttings, and the baskets were home-made.—*California Horticulturist*.

BEAUTIFYING SCHOOL GROUNDS.

Mr. Vick, in his Magazine, says: "With a heartfelt pleasure we received the announcement that a convention of the teachers of the State of New York, recently held at Canandaigua, besides other progressive resolutions they passed, was one to the effect that the patrons of country schools should ornament the school-rooms, and enlarge and beautify the school grounds. It is proper that this expression should emanate from the teachers, and to our minds is indicative of the final accomplishment of the object. If the teachers assist in the movement, it will succeed; the rate of motion at first may be slow, but, with the progress of the enterprise, it will gain momentum, until it shall have passed over our entire land, and we shall be able to point with pride to the external appearance of these modest seats of learning, as we do now to the results of mental training there acquired."

CULTURE OF THE SOIL IN PUBLIC SCHOOL YARDS.

The enormous growth of our population, and the little unoccupied area left for further free expansion, should suggest the serious thought, whether we

ought to require—as other nations are doing by legislative enactment—that every teacher should pass an examination in the principles of soil and plant culture, and that practical lessons in these principles should be given in every primary school. It is a consideration that concerns everybody; and one that eminently deserves forethought and timely action, because years must pass before it can be carried into full effect. During these years, all our really good soil will be occupied, and millions of our acres reduced by thoughtless or ignorant management to a lower and lower state of production; while our forests, which require a century for recovery, will have been wholly despoiled.

Lately a yard was seen, not very large, where about 400 children daily play,—in a railroad town with its full proportion of “street Arabs,”—yet there have been for years growing in it a great variety of plants, vines, and trees, with a handsome flower-bed gracing the front, all as safe as in any private grounds; the leaves unbruised and dense enough,—in the case of one vine supported only by a stake, giving shelter to a bird’s nest within the reach of all hands above ten or twelve, yet so secure that the young were safely hatched. No rules exist for the preservation of these plants, but there is an offer of a reward of \$50, posted up, for the conviction of the spoiler of a tree, outside on the streetway. No teacher betrays personal anxiety; but a feeling of pride and possession is gently instilled, and every plant in the yard becomes dear to each pupil. They are often subjects of pleasing and instructive talk and object lessons.

For lessons in soils, etc., it is a first requisite that our normal schools prepare teachers on the subject. There is as yet no good text-book upon it in our educational lists.—*New York Tribune*.

ORNAMENTING SCHOOL GROUNDS.

I wish to add a word in favor of the effort to awaken an interest in this important subject.

It seems to me to be one of the greatest needs in our present system of education. Our school-houses and surroundings (almost universally) are a blot upon our civilization instead of the bright green spots of beauty they should be—attractive and elevating to look upon.

They are, I am sorry to say, a pretty true indicator of a great lack in our national character—a lack of polish and politeness of manner.

In some respects we are a very artistic people. In no other country in the world are the tools and implements used by all kinds of laborers made with so much reference to symmetry of shape and style of finish as in this country, and a spirit of rivalry exists which keeps up the standard and educates the taste to appreciate the worth of this development of the love for the beautiful.

No boy is willing to be seen with an ax-handle, a sled, or cart that he has made for himself, that is finished in a clumsy, coarse manner. This is as true among the farmers’ boys as any where, and is in striking contrast to the coarse, clumsy implements which are home-made by farm laborers in any other country.

The same may be said of all our manufactured tools and implements. An English dealer in Norway once said to the writer that no other people under the sun could turn so neat a handle for a screw-driver and that he could tell American tools as far as he could see the handles.

In our architecture, in town and country, we average far ahead of other

nations. In the love for fine pictures, the American will compare favorably with any other people. In this regard the last twenty-five years have wrought a great change—thanks to our superior wood and steel engravers, and to Prang's artistic and cheap pictures which now adorn the walls of so many thousands of our farm homes, where they are doing a silent but great work, educating the rising generation to a love for the artistic, which will tell on the future of our character and achievements as a nation.

But in this important matter of floriculture, and the adorning home with flowers, shrubs, vines, and trees, our country boys—and girls too—are far behind other countries, and far behind what they should be. And I fully believe its effects are seen and felt in the rudeness and coarseness of manners of so many of our children.

In France and Germany the peasant laborer, no matter how poor, will have a bright spot of green and bloom in his yard or window, and its refining result is seen in his politeness of manner.

In view of this need in our popular education, the very best place to begin the remedy is at the public school-house. Once well started there, its effects will soon appear among the homes of the pupils, and bloom and culture will take the place of unsightly neglect, and the influence will be towards general refinement of taste and manner, and that polish which adds so much to sterling worth.

May I add a word of suggestion as to some of the ways of commencing this radical reform?

The first steps well taken are the important ones to secure the full benefit of the effort.

In most school districts there are families who have had experience in laying out grounds, and who can easily be induced to help, for the sake of their own and neighbors' children, to keep their school up to the standard of others about.

I would suggest the benefit of establishing a friendly rivalry among the scholars, by dividing the grounds among the different families or neighborhoods. Thus, the front of the yard to be improved and cared for by the Smith neighborhood. The Smith boys to plant a certain tree in the corner; the Jones and Brown boys certain other portions. The south side to be planted by the children from the "ridge road," etc., etc. The girls to plant the flowers and care for them, and these to be kept in the name of the planters.

In this way a personal interest and pride will be established and the natural emulation aroused to have their side of the house as well cared for as the other, which so helps on to effort.

I would suggest that fruit trees and grape vines may well come in for a place in the planting,—not forgetting the useful birch or hazel rods.

I hope to hear of definite action in this matter from many of the auxiliary societies during the present year.

S. H. COMINGS.

St. Joseph, Michigan.

ORNAMENTING SCHOOL-HOUSES.

In the last two volumes of our transactions we have had considerable to say about beautifying school grounds, and the excuse of the Secretary for inserting the capital essay by Miss Emma Field, which was read before the Grand Rapids

Ladies' Literary Club, is that the subject treated of is so akin to the more general one our society has taken hold of so earnestly, that it can not be kept out after once knowing it has been written :

It may be that some of you here have, among your memories of childhood, the picture of an old brown school-house, built by the dusty wayside, without a tree to shelter it from the keen winds of winter, or the glaring sun of summer; with its bare, weather stained walls, destitute of all ornament; its rough benches, with their grotesque jack-knife carvings; its broken down stove, which always, smoked, and the long lengths of rusty stove-pipe.

All around and about this building were seen pleasant, comfortable houses, with grassy yards, white fences, green overhanging trees, and shrubs, giving promise of shade, bird songs, and fragrant blooms. Near by the lawns, wide, ample, roomy, convenient, furnished luxuriant abode for the calves, horses, and sheep of the thrifty farmer, who many times a day visited their habitation to see if they were eating, drinking, and resting well. But his children always went out from under the paternal roof through the summer and winter to the little school-house, not large enough by half, and no question was ever asked about their comfort or safety there. Or it may be your early school days were spent in the crowded primary of some city, where in a low, poorly ventilated building were crowded hundreds of children, waiting to receive normal and mental food from the hands of teachers who had three times the amount of school work given them to do than could possibly be done, even if the children were all well nigh perfect, and no attention whatever was needed to keep them in any kind of order.

And thus it has always been. Our school-houses have not kept pace with the growth of the neighborhoods and the wards in which they were built. Even here in our wide-awake west, the people of our city awoke one morning to find that school-houses but large enough for the children of a village, could not accommodate the children of a city. And rubbing their eyes from their Rip Van Winkle nap, they began to make some modest appropriations. A few rooms were ordered to be annexed to some buildings, and they were straightway filled to overflowing,—a few buildings were ordered built, and they were immediately crowded, and so it has ever continued to be.

In order to be even comfortable for room next year, we need to have two large primaries, and a large union-school building for west side built this summer. I hope the day is not far distant, when in our city the supply of room will be equal to the demand for it; when we can say, "Now, children, here is room for you all; come, and you will receive a cordial welcome."

What right have we to talk about a compulsory system of education, until we have room within our school buildings to accommodate all who may wish, who should wish, to come. And when that happy time shall come, why should not children be urged to attend school? Why should not committees be appointed to clothe if necessary, and to gather in, the hundreds who might come to our common schools, as well as to Sunday school? Having much knowledge of the condition of many of the poor families in our city, I can say with truth, that I know the result of some such work would be astonishing to all who might engage in it.

But my subject was ornamentation of school-houses. And my excuse for this divergence is a sentence from Mrs. Glass' receipt for cooking a hare—"first catch him."

Before I care to talk much of the ornamenting of our school-houses, I wish room in abundance for all,—I wish for high ceilings, where air can be fresh

and pure, where there is room enough so that not more than 40 children shall be placed in one apartment. Then, and not till then, will we cease to hear of teachers giving out in their work, dying because of bad air; or of little children who dislike school, and grow pale and weary, and oftentimes sick with the confinement.

My model school-house shall not be built on a hill. To be sure, a large, handsome building shows off to good advantage on a high summit, and when we poor teachers have time or breath we love to look out on the panorama daily spread before us—the city, the river, the hills beyond—beautiful in the leafy verdure of June, glorious with the varied tints and royal colors of autumn, or grander still in its solemn silence when standing afar off from its noise and bustle, we behold it wrapped in the snowy mantle of winter, glittering with thousands of icy diamonds, while over all, the deep blue sky bends, and the sunset clouds light it up with wondrous glory.

But life is real, life is earnest. Work awaits us, and moments are precious. You enjoy views from your lofty observatory when you have leisure, but you hardly wish your kitchen to be as lofty because of the view. And so I do not wish our teachers to become so tired in climbing steep ascents before the real work of the day commences that they shall have no strength left therefor. Neither do I like to see a troop of children at the foot of a hill start at the first sound of the last bell and run up the ascent, and then up the long flights of steps which await them. So, neither would I have my model school-house more than two stories high, and I should ever hope to be allowed to remain at the foot of the stairs and enjoy the first floor.

As this subject has been discussed at length, I will state the experience of a day, which does not differ materially from the 200 other days of the school year. In order to reach my room I have thirty steps to climb in the morning. I commence my school work before nine o'clock; but in the midst of writing a problem on the blackboard, I am summoned to the door below to see a woman who wishes to know why her child can't be let alone, and not teased when on its way home from school by Billy O'Flannigan, and Bridget, his sister. I go down and up my 30 steps again, and finish my problem, and then see that it is time to ring the nine o'clock bell; whereupon I go up and down my 30 steps again. Before recess in the forenoon I have to go down and up my 30 steps again to see to a street boy who will persist in blowing his whistle and shouting under our windows. After recess, I sit down to show a pupil how to subtract 329 from 432, and just as I am in the midst of my explanation, just as I see a gleam of understanding in the upturned face of the child, in comes a breathless messenger from the play-ground telling me that Mickey O'Healy is pounding Johannes De Glopper awfully; and rushing down my 30 steps I settle the difficulty between Ireland and Holland, and sitting down on the lower step, send for my bell, and wait for the close of recess, so as to avoid climbing those steps again. Before noon I am obliged to go down once, because Jimmy can't find his hat, and is in dire trouble, and then at noon I have to leave my dinner and my work twice before I ring my bell, to attend to the wants of the little army on the play-ground.

Well, the bell is rung, and I have had an hour and a half of rest. Everything goes on smoothly until ten minutes before recess: Nellie comes, with a pale face, saying that Katie has just got hurt, is most killed, for her face is bleeding dreadfully; and I hasten down, to see the woe-gone face, with its cut lip and tearful eyes and swollen nose; I soothe and wash the little one and send her home, then go up and dismiss my class, and then go down and up

my 30 steps only once before four o'clock. But just as I was marking my roll, I hear a fearful cry, and dainty little Freddy comes rushing in to tell me that Pat has hid his hat, and keeps plaguing him so he can't go home. I go down with the much-abused child, find his hat where Pat has thrown it, and catch a twinkle of Pat's legs going down the hill; and as the coast is clear I ascend my 30 steps and finish the task of the day. I have been up and down only 690 steps during the day, for I am fortunate enough to occupy a room on the second floor. If it had been on the third floor the number would have reached 1,380.

Please to remember that climbing steps is only a small share of our day's work. And so I repeat, I should not have my model school-house more than two stories high. About my building I should have grassy lawns, good walks, large, open buildings for play on rainy days, and many trees under whose shade happy, merry groups of children could sit in sunny days. Inside I should have mattings over all the floors, for how can noisy, restless children be expected to keep as quiet on bare, echoing floors, as staid, grown up folks on carpets. I should have the doors arranged to move as noiselessly as church doors, for a great, slamming hall door is as apt to disturb a teacher in a recitation as it would a minister in a sermon. And besides the effect on one's nerves is not remarkably soothing. On the walls should hang beautiful pictures, by which the eye of the child could be trained to forms of beauty, and on which it could look when weary with study, and looking, learn some new lesson, perhaps better than on the printed page. As far as practicable, I would have plants growing in the windows, if for nothing else than to note the eager interest with which the child will watch each unfolding flower and growing leaf. Brackets, pieces of statuary, delicate vines, ferns and autumn leaves, should make this a charmed place, especially to the many who, living in dreary homes, never taste of beauty elsewhere.

How children love beauty! How the poor, starved little souls hunger for it! We talk much of great fields of labor, of noble deeds, of accomplishing something in the world for humanity. Remembering our child life, with its memories of all things beautiful and lovely carefully cherished, what better work can we do than to use our influence to make the spot where the child passes so many hours of its life a place of beauty, a continued delight.

MONEY IN TREE PLANTING.

We may not as yet in Michigan feel the necessity or advisability of tree planting for wood, but there is no question but it will pay to plant certain kinds of timber for profit in the older parts of our State, to be used for mechanical purposes. In Land and Home we find the following statements of profits in tree planting in Massachusetts:

Mr. R. S. Fay, on his estate near Lynn, Massachusetts, planted thirty years ago larch and other European trees. During last winter the itemizing from its plantation yielded him as follows:

175 cords fire wood, sold at an average of \$5.50.....	\$962 50
500 larch posts, 25 cents.....	125 00
51 larch telegraph poles, \$1.00.....	51 00
100 larch railroad sleepers, 50 cents.....	50 00
	<hr/>
	\$1,188 00

The larch must be planted early in spring; but it is not certain that this tree is as profitable as some of our native forest trees. The \$1,188 were the returns for one year, and from this point on for a number of years the yield will be equal to or greater than that.

MOST VALUABLE WOOD FOR FUEL.

Taking shell-bark hickory as a standard value, and calling this value 100, the various common woods will rank in heating value as follows: best maple, 60; soft maple, 54; chestnut oak, 86; red oak, 79; white oak, 52; white ash, 77; beech and black walnut, 65; the branches range from 48 to 63; Lombardy poplar, 40; white pine, 42; yellow pine, 54; pig-nut hickory, 95.

According to the experiment of Marcus Butt, of Philadelphia, over 50 years ago, a cord of dry shell-bark hickory weighs 4,469 pounds, and a cord of dry white pine, 1,868 pounds. The weight to the cord of the hard woods generally used for fuel may be set as: ash 3,450 pounds; beech, 3,236; black birch, 3,115; black walnut, 3,044; hard maple, 2,878; white oak, 3,821; red oak, 3,854; yellow pine, 2,463; Lombardy poplar, 1,774.

RAISING WALNUTS AND HICKORIES.

Thomas Meehan, referring recently, in an Eastern journal, to sowing walnuts and hickories, says there are many persons desirous of raising seedlings of walnuts and other hard-shell seeds, who fail and wonder why they fail. The fault is often their own, for not giving the matter a little thought. It is the practice of many to keep such seeds on the barn floor or dry in barrels through the winter, sowing them in the spring. Now we all know that seeds of the kind mentioned must crack open before they can grow, and some, but not many, know that it is the moisture that does this cracking. Moisture then is what these seeds want in abundance, and all seed want it more or less. Some have thought it is the frost that cracks open the shells, but frost is an injury rather than otherwise, tending to dry out the shells, the opposite of which is desired. It is well to put hard-shell seeds in the ground in the fall, or keep them in a damp place through the winter and sow in the spring, but where neither of these things have been done, and the sowing is desired, they will grow very well the coming season if put into cold water until they have become thoroughly soaked. Thus treated, the nuts will take up in a few days as much moisture as they would have done had they been in the ground the whole winter, and this is all they want to make them crack their shells and grow. When it is not forgotten that moisture is the essential, seedling raising becomes much less of a mystery.—*Prairie Farmer*.

TREES AND TAXES.

Treeless Iowa is being transformed into a forest-covered country, by a law which remits certain taxes for five years on every acre of fruit, and ten years on every acre of forest trees planted and kept alive. Over 75,000 acres of

fruit and forest trees have been planted, and \$200,000 have been remitted in taxes.

FORESTS AND WATER SUPPLY.

The following item is picked up without credit: As regards the influence of trees on moisture, careful observation has confirmed the theory that more rain falls on forests than on open plains, and, comparing different kinds of trees, it is found that the pine tribe get and retain more water than leafy trees. Hence, it is said, pines are the best defense against sudden inundations, and the best means of giving freshness and humidity to a hot and dry climate such as that of Virginia, where attempts at amelioration have been made by planting and by digging artesian wells.

A GOOD WORD FOR THE CATALPA.

The hardy catalpa tree is well adapted for post timber, being easily transplanted, a fast grower, and in ten or twenty years will be large enough to cut for posts. We have proof in northern Indiana and Illinois, where this tree is a native, that it will last for posts fifty years or more. The hardy catalpa is being planted extensively in some parts of the west. Robert Douglass & Sons, of Waukegan, Ill., planted, for other parties, by contract, two years ago, 100,000 small trees, and last year 220,000. This year they have a contract to plant, in the fall or next spring, 1,500,000. We at the west are progressive farmers and horticulturists. We are sometimes rather fast to adopt new things, but we hold fast to that which is good. I have read of ten virgins, five were wise and five were foolish; the wise took oil with them to trim their lamps, but the foolish did not, and their lamps went out when they were in great need of light. We have two sets of farmers. The wise will plant catalpa trees for fence posts, but the foolish will not, and when their oak posts are rotted off they will say to the wise, "Give us of your catalpa, for our oak posts have rotted off." But the wise will say to the foolish, "We can sell all the catalpa we have to spare to the railroads for ties for more money than you can afford to pay for fence posts."

SEWEL FOSTER.

Muscatine, Iowa.

CHESTNUTS IN MICHIGAN

Would it not be the proper thing for this society to encourage the planting and culture of the chestnut tree in Michigan? It is a favorite as a shade tree, would be a splendid tree to grow in the school-house yard. Its timber is valuable, and the nuts have a good degree of food value, and for amusing the "small boy" in gathering and eating, its usefulness cannot be overestimated.

The home which yearly has a barrel of chestnuts put in the cellar to be enjoyed during the winter evenings will have an attraction for the boys that will go far towards keeping them away from the street.

Will some of our older members give us a few hints on the proper soil, location, and culture to make the effort a success?

St. Joseph.

S. H. C.

THE CHESTNUT.

I am disposed to think that the chestnut, as a fruit for market, will well repay its cultivation. On our high ridges throughout the whole lake shore, and also through the country, its growth appears indigenous. This consideration, with the facts that our common chestnut always results in ready sale at a remunerative price, leads me to the impression that land could be most profitably employed in the growth of the Spanish or French chestnut varieties, the fruit of which is in size nearly double that of our largest native varieties, and which I think can be profitably engrafted upon the native tree. The sowing the seeds of the Spanish and French chestnuts was some years since done by Prof. J. P. Kirtland of Cuyahoga county, O., and in six years he had large crops of chestnuts, as large as bantam hens' eggs, while his trees were beauties in form. It is a fruit well known—it is said five hundred years before Christ—and English works give an account of an immense tree in Gloucestershire, measuring fifty-three feet in circumference, although it is not indigenous to that country. Account is also given of one at Mount Ætna, said to be three hundred and four feet in circumference. In the time of Pliny the chestnut was much used as an article of food for the peasants, while the rich used it much in the formation of puddings, etc. In an English work now before me, it is said that there are instances in Italy of persons living to nearly one hundred years who have fed wholly upon the chestnut.

The uses of the tree in the arts are varied and numerous. As an inside finish to a room, the second growth wood of the chestnut makes the handsomest wood-work, simply oiled, that has ever been known. Not one architect in a thousand knows it. The bark is used for tanning, while the wood is exceedingly durable and strong for any purpose.

Now is the time to plant, as the leaves have dropped, the soil is warm, and root fibres will at once grow.

F. R. ELLIOTT.

PLANTING A TREE.

A beautiful custom, not too frequently followed, is the placing of a tree for a friend in his own grounds. Queen Victoria does this in memory of her visit, and her loyal subjects point it out as one of their precious possessions; visitors pluck a leaf, press and preserve it. We once knew a pair of old ladies, whose botanical nomenclature was peculiar and attractive. All their plants and trees possessed a value to them as gifts from friends. Mrs. —, or Mr. —, had presented this and that. A gentleman of our acquaintance, much inclined to visitations when in England, is accustomed to ask the privilege of planting a Cedar of Lebanon in the grounds of his hosts. Mr. Penn, the great-grandson of the founder of Pennsylvania left such a tree of his own importation in the garden of a personal friend in Germantown, where he had passed much of his time during his long visits to us, and it flourishes well. There is no better commemorative act of friendly companionship. The tree is a perpetual and growing evidence of regard, to be passed down to posterity, when—it may be—traces of giver and receiver are nearly lost. The memory of a friendly visit may be preserved even in a more simple manner by the planting of a favorite enduring bulb or flower.—*Gardeners' Monthly*.

TREES FROM SEED.

To obtain trees from the seed of nearly all forest trees, the nearer we can follow the treatment that nature gives the better. Therefore, soon after the seeds have dropped, put them in rows or broadcast on fine soil, rake in slightly, and litter over all with leaves, or old straw or the like, quite lightly; if too much, take most of it off early in spring. The second year set the seedlings in rows, three to five inches apart in row, and cultivate two years, then plant out for permanent growth.—*H. Ives, in N. Y. Tribune.*

LAW CONCERNING HIGHWAY TREES.

At the recent session of the Pennsylvania legislature a law was passed to encourage tree-planting along highways. Elms are to be not less than seventy feet apart; other forest trees not less than fifty feet, and locust trees thirty feet apart. The owner of property on which such trees are planted has his road tax reduced at the rate of \$1 for each four trees so planted. The trees must be living one year after planting, and be well protected from animals. Injury to such trees is punishable by fine.—*Practical Farmer.*

HAS THE TIME COME TO PLANT TIMBER ?

Yes! verily, my friends it is indeed time that we were thoroughly aroused to the importance of this matter of the conservation of our forests. We should plant shade trees and groves, shelter belts and woods; yes, and where suitable conditions exist, we should also plant extensive forests for the sake of their future prospective, but certain benefit to ourselves, and to those who are to come after us. Why will we not learn from the experience of past ages, which is everywhere expressed so plainly in the history of nations, and impressed so manifestly in the desert scars of the earth? Let us take warning betimes and begin now, and at once undertake the preservation of our forests.

Forests are the conservators of moisture, sources of the streams. "The tree is father to the rain," was a favorite saying of Mahomet. Then again we must remember that time is needed for the production of a tree. The botanists call them perennial plants, because they continue their existence through the years. Vegetables of this class do not build up their massy structures, composed of concentric layers of solid fiber-cells, with the rapidity of the fungi, some of which will evolve millions of their cells in a few hours, visibly enlarging while we behold. Nor can the trees be compared in their periods of growth, and the quickness of their cash returns, with the familiar tillage crops of the agriculturist. The weeks and months needed for the production and perfecting of garden and farm crops are represented by the decades and centuries of years required for clothing the denuded surface with forest growths of mature and useful size. It is, therefore, high time to begin the work. Be not discouraged however, trees grow fast enough. One of the classic writers of the age, who fully appreciated trees, put his own sentiments into the mouth of one of his rustic characters when he wrote: "Be aye sticking in a tree, Jock; it will be growing the whiles ye are sleeping."

Those of us who are now past middle life, no doubt many of you now

present, can point to noble trees which have grown within your own recollection; some of them perhaps were planted by your own hands. Strange as it may be, however, it seems nevertheless true, that old men,—those who cannot expect to see, nor to reap the fruits of their labors in forestry,—are the most energetic tree planters, rather than those just entering upon life, with a bright future opening up to them decades of prospective enjoyment, and with a reasonable expectation of life even comparable to the term necessary for the development of a useful tree. Old men are proverbially the tree planters everywhere. In regard to their periods of development, there is a great diversity among trees. Some have a brief rotation. The coppice growths in European forestry are often utilized in periods of ten or fifteen years; in our own country too, we have many trees of short rotation, and some of the most useful and most profitable trees are of this character.

The black locust may be harvested after it has grown 20 or 30 years.

The catalpa speciosa, in the same period, will make good cross ties and fence posts.

The ailanthus very soon attains a useful size, and for certain purposes has been very highly commended, both in this country and in Europe. Prof. C. S. Sargent is advising its extensive plantation, and some years ago it was spoken of as the most promising tree for the arid plains of the southwest.

The forests of Scotch pine in Germany are allowed 60 years to reach their useful size for fuel and for timber.

The birch there reaches its maturity in about half a century.

The willow used for charcoal needed in the manufacture of gunpowder may be cut after growing 20 years or even less.

Chestnut in its second growth is most profitably cut every 20 or 25 years.

The beautiful wood of the wild cherry soon reaches a profitable size for many purposes, though for saw-logs and lumber the trees should be larger.

Many individual trees, planted by the pioneers upon the broad plains of Nebraska, within the few years that white men have occupied the so-called "American Desert," have already attained to useful size and will yield each a cord of firewood to cheer their owners. While the census reports represent the extent of woodlands in Ohio as covering about one-third of its total area, which is a full ratio for lands situated like ours, we are not informed as to its condition. The skillful forester, however, cannot fail to observe that these tracts are very far from being in a condition to yield the best results, either economically or in their influence upon the climate and water-courses of the adjacent regions, and he finds them much less satisfactory in regard to their own improvement and perpetuation by succession.—*Dr. J. A. Warder.*

PECULIARITIES OF THE PINE.

The pines, or rather the cone-bearing family of trees (the *Coniferæ*), are very distinct from other vegetation in a great many of their ways and habits, as well as in structure. While they resist more than deciduous trees in some particulars they succumb to other conditions which the broad foliaged sorts endure. They will not sprout again when cut down, having no latent buds on collar, stem, or roots which can serve as a reserve resource. Nor will they abide any cutting or even mere external drying of the roots; all that are so cut perish, and only the smaller or shorter roots which remain entire to their ends can

continue to absorb and supply watery sap and receive accretion of growth from the sap sent down from the leaves. The deciduous larch shows these peculiarities as well as the evergreens. But while so tender in these particulars, the conifers will endure external rubs and strains that are fatal to other trees. We often see whole stretches of pine among which there were once growing oaks, hickories, and all that tribe. These have been exterminated by fires, which have scorched but not killed the pines, and left them completely dominant—masters of the situation. So old pines that have been cut and rubbed till they shed tears of turpentine from every one of a dozen great scars, still continue a healthy growth, though pitiable objects to the sight.

A very remarkable case of endurance of a Scotch pine, when wounded, as one would think, to death, is to be seen on the grounds of the Hon. Fielding Beeler, of Indianapolis, Ind. The tree was girdled by the destruction of all the bark from fifteen inches of its trunk, when measuring twelve inches in circumference. The mischief was done by "sap-suckers." The branches and stem above the injury have continued to grow and thrive, but below it they have made scarcely any growth, and only two branches out of six or eight have been left below the girdle. The tree has maintained its bright green, and has made as much growth laterally, though not in height, as other trees around it. The secret of this extraordinary power of endurance and recuperation is no doubt that all the external pores of the wood were filled with a varnish or resin soon after the wound was made; the date at which it was made was favorable to the quick formation of this sealing up and prevention of all wasteful flow—probably about August. This varnish only fulfills one service of the bark, however, that of supplying a waterproof epiderm, preventing dessication. It cannot aid in the digestion of sap, nor can it well convey what has been digested above to be distributed to the stem and roots below. As the stem has enlarged below the girdle to some extent, but the branches below the girdle have dwindled, the case seems to corroborate the views of those who believe that the ascending crude sap mingles into itself, as it ascends, some of the rich prepared sap which flows downward, and thus becomes the richer the higher it ascends. The girdle is now but about twelve inches long, a lip of new growth having covered about three inches of its upper portion, and the only visible exudation of resin is a little from the edge of this lip. By the study of such cases we learn lessons like those which the hole in Alexis St. Martin's stomach supplied to human physiologists.—*N. Y. Tribune.*

TRANSPLANTING EVERGREENS.

It may be well to repeat what we have said in substance before, that the latter end of August is one of the best seasons of the year to transplant evergreens. The young growth of the past season has got pretty well hardened, so as to permit of very little evaporation, and the earth being warm, new roots push with great rapidity, and the tree becomes established in the ground before the cool autumn winds begin. The chief difficulty is that the soil is usually very dry, which prevents much speed with the operation, and, the weather being usually very warm, the trees have to be set again in the ground almost as fast as they are taken up, so that it is not safe to bring them from a distance. It is as well, therefore, to make all ready in anticipation of rain, when no time may be lost in having the work pushed through. Should a spell of dry weather ensue,

which in September and October is very likely, one good watering should be given, sufficient to soak through the soil and well about the roots. A basin should be made to keep the water from running away from the spot and to assist its soaking in. After being well watered, the loose soil should be drawn in lightly over the watered soil, which will then aid in preventing the water from drying out soon again.—*Gardeners' Monthly*.

VEGETABLE GARDENING.

How can we better open this division than with the following quotation from Burnett Landreth?

Gardening in its higher sense is both an art and a science. It has arrived at this estate by gradation,—slow compared with the development of many other pursuits; but that is consequent upon the complex nature of its parts. The development of a knowledge of geology, chemistry, meteorology, vegetable physiology, and botany,—indeed, something from all human learning,—has gone to perfect the science of Agriculture and Horticulture,—pursuits affording as wide a range of research in their ramifications as any topic occupying the mind of man, and as important in their results as any occupation of man. Gardening, which is agriculture upon circumscribed spaces, has ever shared with the latter the esteem of mankind. Socrates said, “It is the source of health, strength, plenty, riches, and honest pleasure.” And an eminent English writer said, “It is amid its scenes and pursuits that life flows pure, the heart more calmly beats.”

KITCHEN GARDENS vs. DOCTORS' BILLS.

Somehow our farmers make a great mistake with their farming. I do not say all farmers, but there are many. They have from 40 to 400 acres of land, and yet their brothers in town have finer gardens and more small fruits than the average farmer. Is there any good reason for this? The farmer will say, “I have no time for making gardens, and it don't pay to let the hired help do it.” Yet, to say the least, it is very convenient to the house-wife to have a garden to go to when she wants vegetables for dinner. I am sure the farmer likes vegetables as well as any one, and the garden will save a grocer's bill, and perhaps a doctor's bill.

It is not so much the work we do as the warm house we stay in that is killing so many women. Not a moment to get out and inhale the fresh air. No, she must stay in the house and bake, boil, stew, and make pies and cake to give the family some kind of disease resulting from too rich food. Pies and cakes are not healthy. Fruits and vegetables are. More fruit and less grease is what we want.

I would not know how to do without a garden. How nice in harvest time, when the men come to the house tired and warm, to have some nice, cool water-melons for them to eat, and how much nicer fruit is for dessert than a greasy lard pie. One feels refreshed after eating fruit, but never after partaking of pie. The average farmer has to work very hard, and there is no reason for his denying himself the few little comforts to be had from a garden. But some people seem determined not to see anything beautiful or enjoy any of the many good things in this world. They go through life with their eyes shut to anything like pleasure; they see mammon and nothing else; that is their god.—*C. in Post and Tribune.*

PLAN FOR FARMER'S GARDEN.

I designate it "farmer's garden" for it is not supposed that city people can have the room and conveniences which I shall describe for managing it on my plan. First, I don't believe in having a set and permanent enclosure for the garden, if it can be avoided; so I would use for garden purposes any good strip of land near the house bordering on the lawn, if possible, and enough of it to have, say, two-thirds lying to grass, and one-third in use for vegetables each year, following the rotation of a three-years' course, having the ground well seeded to orchard grass and clover, and plowing one-third each year so as to plant on a fresh turned turf worked down to a fine seed bed, which it is well known is not inclined to be weedy the first year. Then seed this down and take another fresh two-years-old, clean turf, following in this regular three-year course for planting, and mowing the balance. Then the tillage, if properly managed, can be done about as easily as in a large farm lot, mostly with horse and cultivator, as for corn or potatoes. To do this I use a piece of land (as above described) or take similar land that may be fitted near by, for a planted field, mark it out as for potatoes, then do all the planting in these rows; or in case of vines use every other row, and go through it as often as once a week, or ten days; then by using a hoe, or light garden rake, the farmer's garden can be managed with complete success.—*H. Ives, in Practical Farmer.*

CELERY.

Those who know celery only in its rare state lose half the enjoyment of that excellent vegetable. Cut up in small pieces, boiled until tender, then seasoned by adding milk, butter, and salt to the water in which it is cooked, it makes a delicious dish, toothsome for anybody, and especially good for persons afflicted with weak nerves. The parts not sufficiently blanched or tender to eat raw may be utilized in this way.

THE ORIGIN OF THE TOMATO.

Many Americans think that the luscious tomato had its origin in this country, because it is so freely used here, and that it has become quite recently

an article of food. The origin of the vegetable, or fruit, as some claim that it is, is not positively ascertained, though there is reason to believe that it was first found in South America, and that it was cultivated centuries ago in Mexico and Peru. Several varieties were known in England towards the close of the sixteenth century, and Gerard, the surgeon and botanist, speaks of it, we think, in his "History of Plants," having himself introduced it into the Kingdom as an exotic. Dodeus, the Netherland herbist, mentions the tomato as early as 1583 as a vegetable to be eaten with pepper, salt, and oil. It belongs to the nightshade family, and was used in cooking by the Malays more than a century and a half since. It is extensively raised in southern Italy, and employed there as an accompaniment to nearly every dish, particularly to macaroni. But neither there nor any where else in Europe is it commonly eaten, as it is here, separately and in quantities. In England it is sparingly produced, requiring a hot-bed in the spring, and in consequence is high-priced. The Italians formerly called it golden apple, and now call it love apple, as it was once designated in this country. The appearance of the tomato on the table has greatly increased in Europe in the last few years; but in no land is it a regular dish, much as it is used for sauce abroad, as in the United States, where it is also pickled, preserved, and confected.—*Grange Visitor*.

ROOT PRUNING FOR TOMATOES.

Root pruning of tomato plants is recommended to induce early maturity of the fruit. While the plants are young they are transplanted several times, which of course destroys some of the roots, and after they are put into their final resting place, a spade is once in a while thrust down into the ground a foot or so from the main stalk. In this, of course, size, and perhaps quality, are sacrificed to a few weeks' earliness; but many are willing to pay this penalty for the sake of the early dish. Those wishing to secure an early ripening of fruit will do well to practice this system of root pruning upon a portion of their plants. Tomato plants produce better and more evenly ripened fruit when afforded some support, as by stakes or trellises, to keep vines from the ground.—*New York Herald*.

PROPAGATING SWEET POTATOES.

A New Jersey correspondent has tried to his satisfaction the experiment of propagating sweet potatoes from vines saved during the winter. In the fall, any time before frost, the vines may be cut in any length and placed in layers on the surface of the earth to the depth of twelve or eighteen inches. Cover the vines whilst damp with partially rotten straw to the depth of six inches, and cover the whole with a light soil about four inches deep. In this way the vines will keep during the winter, and in the spring will put out sprouts as the

potato itself when bedded. The draws, or sprouts, can be planted first, and the vine itself can be cut up and used as we generally plant slips.

TAR WATER FOR INSECTS.

For the last five years I have not lost a cucumber or melon vine or cabbage plant. Get a barrel with a few gallons of gas tar in it; pour water on the tar; always have it ready when needed; and when the bugs appear give them a liberal drink of tar water from a garden-sprinkler or otherwise, and if the rain washes it off and they return, repeat the dose. It will also destroy the Colorado potato beetle, and frighten the old long potato bug worse than a thrashing with a brush. Five years ago last summer both kinds appeared on my late potatoes, and I watered with the tar water. The next day all Coloradoes that had not been well protected from the sprinkling were dead, and the others, though their name was legion, were all gone, and I have never seen one of them on the farm since. I am aware that many will look upon this with indifference, because it is so cheap and simple a remedy. Such should always feed both their own and their neighbors' bugs, as they frequently do.—*Chicago Tribune*.

MISCELLANEOUS.

DO NOT HANDLE.

President T. T. Lyon advocates a rule at fairs, rigidly enforced, forbidding any person handling the fruit on exhibition except by authority or permission. The rule should be printed and posted up where all could not help but see it. One or two severe examples made of transgressors would soon cause it to be respected. Fruit men themselves are the worst to manage. Even they should be prevented from handling their own fruit after it is once in place.—*Rural New Yorker*.

GET INFORMATION AT THE MEETINGS.

The young aspirant for honors in horticulture may *acquire more knowledge by attending a few meetings and exhibitions* than by months of study of his favorite authors. It stands to reason that the accumulated wisdom of all our higher authorities on the subject, coming as they do from different localities, with a varied experience, and in many instances with distinct specialties, can impart to the seeker after information precisely the kind he stands most in need of.

It is well for him to gain the rudiments from books, and to carry out the ideas thus gained in a practical way; but after all, the information thus gained cannot prove so satisfactory, nor can it be so indelibly impressed upon his mind, as by actual contact with the authors themselves, when giving their respective experiences upon the same subject. And more than this, the exhibitions of plants and fruits will attract the attention and enforce suggestions upon the minds of very many people who do not read the works on horticulture at all.—*N. Y. Tribune.*

POMOLOGY IN THE PUBLIC SCHOOLS.

Fruit is nature's confectionery—not satiating and debilitating, concocted from indigestible compounds that fret the soul, but appetizing, cleansing and rejuvenating—an artistic blending of the rarest colors, the most delicious flavors and delicate perfumes. In these choice viands nature compensates for the retirement of life, yet how few of all our fruit-loving race, living in a country especially adapted to fruit culture, enjoy to the full this great boon. But when one man has learned how lavishly the earth yields these favors, and is appreciative, he influences his neighbors like yeast in the dough—he unwittingly becomes a missionary. Therefore let us rear a monument for the man who shall provide for instruction in pomology at our public schools. “What! shall we have a fruit garden attached to the school-house, where the seductive strawberry shall sport, and the peach and pear gratify, hungry, ungracious urchins?” I hear asked. Well, projects more unwise have been successfully launched.

But no one could object to at least a plain, homely lecture on the subject before the school occasionally; and it could not be other than helpful. The effects of sunshine, winds and droughts; of heat and frosts; the form that fertilizers must assume before becoming available as plant food; the small proportion of branch and fruit that comes from the soil; how the roots extend and gather nourishment; how plants grow, and how the sap circulates; the effects of hybridization on the plant, the fruit and the seed; how to originate new varieties, and the methods of budding and grafting, are among the subjects which could be discussed with interest and profit. If nothing more was taught than how to graft—which could be done in a short time to a large number—great results would be attained. This is a country in which literature and the fine arts receive fostering care; railroads and steamship lines are subsidized; manufactures and commerce are nursed; but the great interests of agriculture, horticulture and pomology are, in a measure, ignored.—*Charles A. Green, Monroe Co., N. Y.*

DISTRIBUTION OF REPORTS.

Pres. T. T. Lyon, early in the year, contributed an article to the Michigan Homestead from which we make the following extracts:

The State Pomological Society has, for several years past, been without an adequate membership. The work which has been done has been due to the gratuitous labors of a very few persons. Gentlemen, not members, have been

in the constant habit of attending its meetings and profiting by its discussions, and the courtesies of the people with whom they are held, without consideration of any kind, leaving the burdens to fall upon a few public-spirited persons.

At the annual meeting, last winter, at Allegan, this difficulty came under consideration, in connection with the question how best to reach and influence the broad regions of the State in which the society is absolutely without membership, and, at the same time, give itself some adequate basis of support, in case its present necessarily uncertain process of winning pecuniary support should become no longer available.

The result of a careful consideration of these difficult questions was a plan for the organization of local auxiliary societies. It was not and is not proposed to sell the annual volumes of transactions to these societies, or to any body else, but merely to place the membership fee of local societies high enough to cover both memberships, leaving still the usual fee in the treasury of the local society, and making the officers of such societies the medium, and its membership, to a considerable extent, the basis for the distribution of such volumes, by providing that each member of the local society shall receive a copy.

The plan looked, not to rendering the local society subordinate, but rather to affording a means through which the state society could aid local organizations, by making them the medium for the distribution of circulars, books, and information in various forms, as well as the sources whence should spring the invitations for the holding of its periodical meetings, and the arrangements through which they could be made interesting and profitable.

It is certainly true that the transactions of the State Pomological Society are published by the State, but it is equally true that the society is made the custodian of a portion of the same, and that it is by law required to exercise a discretion in their distribution. This it has endeavored to do, and it is being done under the impression that the payment of the usual fee of membership in the society constitutes the best possible evidence that such person is likely to make a wise use of such volume.

HOW TO MAKE A POMOLOGIST AND FARMER.

The following letter was sent to Mr. P. C. Reynolds, editor of Rural Home, and his reply published in that paper gives so many good hints that we gladly give it a place here:

DEAR SIR:—You will find it in your power to oblige me greatly by sending me answers to the following questions, with such additional remarks as you can, to aid the intent of this investigation, which is to learn how to make a pomologist and a farmer out of the common boy.

First—What general education should a boy designed for a fruit-grower and farmer receive?

Second—What special studies will be required?

Third—Must such a boy be trained in chemistry and botany?

Fourth—Will entomology be of any service in enabling him to protect his vines and crops from insects?

Fifth—Should microscopy constitute a part of his acquirements? Are many of the pests of farm, garden, and orchard, small enough to require microscopic aid in their discovery and extermination?

Sixth—Can an enterprising fruit-grower keep abreast with his time, for the most part, without German and French? Are they necessary?

Seventh—What are the qualifications for a preserver of fruits, including canning?

Eighth—Is manual dexterity required in a farmer or fruit-grower, and how is it to be acquired?

Ninth—Is it desirable to be able to draw?

Tenth—To what extent is a literary education necessary or desirable?

Eleventh—Can a pomologist or farmer remain in the front rank of his vocation without attending associations?

Twelfth—To what extent do the pomologists of Michigan suffer from lack of education, from ill-directed effort, and ignorance of well-known principles?

Very sincerely yours,

D. C. HAUXHURST.

Battle Creek, Mich., June 1, 1880.

REPLY:—Although the above was a private letter, the questions are of general importance, and we therefore answer them through the Rural Home. We number the replies to correspond with the questions:

First—A boy should be educated, primarily, to become a man, to develop all of the attributes of manhood, as true manhood is the end or purpose of his existence, while the vocation he is to follow is rather a means to an end. At school a boy learns how to pursue those studies which he should continue through life. If his parents have the means, it is well for the child to study in school the various branches of mathematics, geography, literature, physics, metaphysics, and general science that he may wish to pursue through life, as far as it is absolutely necessary to have a teacher.

Second—The answer to this can better be given in reply to subsequent questions, although we will say here, that, in addition to special studies mentioned in subsequent questions, it would be well for a boy intending to follow the vocation of tilling the soil, to acquire a good knowledge of natural philosophy, that he may understand the principles on which machinery operates, and also light, acoustics, meteorology, etc. Anatomy and physiology would assist him in caring for his dumb beasts.

Third—To till the soil, grow crops and fruit, it is quite essential to an intelligent understanding of the whole subject that a boy shall learn the composition of the soil, of the various plants, and the fruit they bear, of the plant-food in the soil and the best way to promote its solution and absorption by growing plants, and the best way of saving, compounding, and applying fertilizers, so as to realize the maximum of good with the minimum of loss. Such knowledge is to be gained from the study of chemistry. It is also desirable to know how plants grow, their various parts, and their offices or functions, and how to learn the name of strange plants by analyzing their flowers, leaves, etc. Such knowledge is gained by the study of botany.

Fourth—Almost everything the farmer or pomologist grows is subject to insect depredations, and new ones make their appearance almost every year. By studying entomology he is enabled to learn the names, characteristics, and habits of those insects, and is better prepared to make intelligent warfare upon them. He may also learn what insects are enemies and what friends, and be deterred from destroying the latter. Almost every insect that afflicts mankind has an enemy that preys upon and destroys it, and such should be spared.

Fifth—Microscopy will assist materially in examining and identifying insects,

observing their movements and habits, and also in identifying various kinds of fungi that cover and destroy plants. There are not many species of insects injurious to vegetation but what are visible to the naked eye in some stages of their growth, but not always in the incipient, but to examine all their parts so as fully to identify them, the microscope is useful and sometimes indispensable.

Sixth—A knowledge of German and French might sometimes be convenient in reading some works in those languages not translated into English, but we know of a good many fruit-growers who keep fully abreast with the times without the knowledge of any but their mother tongue.

Seventh—No special qualifications except learning the trade, although a knowledge of chemistry might be of some use in understanding why heating and exclusion of the atmosphere preserves the fruit.

Eighth—Manual dexterity is very important in the practical operations of the farm and fruit grounds. It is bestowed, in the first place, by nature, but may be greatly improved by practice.

Ninth—Drawing would certainly be a great aid in conveying knowledge of fruits to others, and would be a gratification to the possessor.

Tenth—A literary education is as necessary and desirable to one engaged in rural pursuits as to those of other callings, excepting perhaps teachers, writers, lecturers, and preachers. A tiller of the soil is alone much of the time with his own thoughts. It is quite as important that he should have great themes employ his thoughts as others; in fact, he is above all things else a man, and everything that contributes to the growth of man intellectually, morally, or æsthetically is appropriate for him.

Eleventh—Perhaps he can, but much benefit may be derived from attending pomological conventions. If no other, the enthusiasm created where numbers meet and talk about a common pursuit will repay all cost and trouble of attending such meetings.

Twelfth—I am not disposed to criticise or judge the pomologists of Michigan. I consider them fully abreast with the vanguard of horticultural improvement, although there undoubtedly are many things in which a thorough education would expedite their progress.

In conclusion, I would add that a man to succeed in pomological pursuits must be naturally endowed with certain qualities or capacities. He must be industrious, persevering, patient, capable of entering into details and of estimating the value of small things. He must be a close, sharp observer, quick to detect any unfavorable influences or enemies at work among his fruit, capable of making experiments and tracing effects to their causes; fertile in expedients, and, above all, he must have a love for his business. Added to these qualifications, he should possess the judgment, shrewdness, and suavity required in traffic to enable him to market his products.

OBJECTIONABLE FRUIT PREMIUMS.

Why will our agricultural societies persist in offering the principal premiums for the "largest number of varieties" of the different kinds of fruit? The tendency is already towards too many kinds, and to offer premiums in encouragement of this already existing evil is a great mistake. Where one has too

many varieties it is very annoying to keep them separate, as to do so requires more room for storing, etc., and adds greatly to the labor and expense of marketing. Better if our crops were of a few leading varieties than to be bothered with twenty bushels of this, ten bushels of that, five bushels of the other, and so on.

Besides, giving premiums to the largest number of varieties encourages a few unscrupulous persons to procure their fruit of other growers and exhibit it as their own. In this county about one-third of the amount given in premiums is offered in this objectionable manner, and the consequence is a sort of "scrub race" to see who will drive the furthest and pick up the most. Fruit-growers who are in the main honest are effectually ruled out. Can our agricultural societies afford to award premiums that in effect encourage rascality?

There is but one argument in favor of this practice—it makes it easy for the judges to decide who is entitled to premiums. Any one who can count is competent for this. If it is considered absolutely necessary to give a premium for the "largest collections" of apples, pears, etc., the amount so offered should be reduced. Let the man who tries to grow fruit of the finest quality have a chance also.—*Nelson Ritter, in Rural New Yorker.*

HURON COUNTY FOR FRUIT.

We wish the special adaptation of Huron county for the growing of fruit on a large scale were more generally known amongst those practical in such business. A study of its situation, with the deep waters of Lake Huron and Saginaw bay surrounding it on three sides, ought to convince all who understand the ameliorating influence of water upon climate that these shores would be especially favorable for fruit. The winters are never so cold here as in the interior and southern parts of the State. The isothermal charts prepared by Prof. Alexander Winchell, published in the atlas of the State, show that the January temperature of this point is the same as that of Fort Wayne, Ind., the great fruit belt on the western shore of the State, Bloomington, Ill., and Northern Missouri. Rarely does the thermometer mark zero—not once during the past winter—while during twelve years of personal knowledge we have only once known the mercury to sink to ten below. These bodies of water have a most beneficial effect in averting frosts both in the spring or fall, so that there is rarely any failure of the fruit from this cause. In such a climate not only the hardy apple and plum but the tender peach and grape can be most successfully grown.

This is not a matter of theory but of fact. It is being demonstrated yearly, though on a comparatively small scale, that nowhere can the fruits named be produced in greater abundance or perfection than here. Some, through ignorance or neglect, have been disappointed in the slight effort to obtain an orchard, but the fault is neither with the climate or soil. As an earnest of what can be done, we would invite an inspection of the trees in the various gardens of this village. A few days since a gentleman familiar with the great orchards of western Michigan, after looking through several of these—and especially that of W. H. Cooper, where intelligent care and enthusiastic love for his trees are united—acknowledged that he had never seen anything superior, and expressed

wonder that these shores were not in equal demand with those of the "fruit belt" for the same purpose.

Our situation as regards markets and facilities for shipment are, or soon will be, of the best. By boat there is daily communication with Port Huron, Detroit, and Bay City, and will be with the lumbering towns across the bay. A railroad to Port Huron will be finished this year, and one to Pontiac and Toledo is probable. Suitable lands can yet be had at very reasonable rates. We call attention to this subject now as one of importance, in the hope that some may be induced to come and inaugurate the extensive growing of fruit as their main business when they see the marked success attending the efforts made in a small way.—*Huron Co. News.*

APPLES FOR EXHIBITION.

At the late meeting of the State Pomological Society, and at several previous to the one held at Allegan, there were some discussions as to what apples should be selected for exhibition, or rather which should be allowed to compete. The following pertinent remarks we take from the Canadian Horticulturist, as covering the points which were taken by Mr. Lyon, Mr. Beal, and others:

No doubt much of the dissatisfaction among exhibitors of fruits about the awards made at our fairs arises from ignorance of those points which ought to guide a wise judge. In nine cases out of ten the intending exhibitor thinks only of size, and he selects from his orchard with the idea that whoever shows the biggest will surely win. If he were competing for the best ten varieties, and a pumpkin could by any means be grown on an apple tree, he would surely include it in his list, regardless of its worthlessness in other respects.

A very little consideration will show that this point of size is of little or no value except among cooking apples. For instance, place on the table for dessert on one plate the diminutive Lady Apple, or the juicy, melting Fameuse, or the crisp Swayzie Pomme Gris, and on another the Cabashea, the Cayuga Red Streak, or the Gloria Mundi; then give your guests their choice, and no better test may be made. Even in the same variety of apple, size is not so important as uniformity of shape, fineness of grain, and general beauty of appearance. As a rule, the largest Greenings have not the finest grain nor the best keeping qualities; the rule applies to other kinds, as has been well exemplified during this season of abnormal growth. All these points ought, therefore, to be considered, and that very attentively by the intending exhibitor when selecting his fruit. Blemishes of every kind utterly disqualify fruit for competition; but of blemishes, the ruinous work of the codling moth is most to be avoided. It seemed hard on one occasion for the writer to agree to set aside plates of huge Cayuga Red Streaks of magnificent form and color on account of this one fault, and award a first prize to a plate inferior in other respects, but perfectly sound. But what else could be done? How would it do to have our exhibition tables laden with wormy fruit, and the rearing of that disgusting enemy encouraged among our fruit growers? On one occasion we were just awarding a prize, and my colleague was preparing to place "First Prize" on a beautiful plate of apples, when I said, "Let us look under this label, so

carefully pasted on." Oh! see the art displayed in so carefully hiding this worm-hole! How quickly the whole plate was set aside may be imagined.

In collections, much regard should certainly be paid to a selection of varieties that would best satisfy the average planter in the section of country represented. He would want a succession of apples for the year, and as far as possible he would want table, market, and cooking varieties for each month. One collection of twelve varieties we found to consist of winter varieties only, and if quality of fruit and beauty of appearance were the only tests this would have gained the first prize, but considering what poor satisfaction such a collection of twelve varieties would give a farmer for home use, we agreed to set it aside in favor of a better assorted collection.

Correct nomenclature is another all-important point in the exhibition of fruit. Indeed, we think that no fruit should be awarded a prize under any circumstances, seedlings of course excepted, that either are unnamed or are incorrectly named. Half the satisfaction of the visitor to the fruit department is lost if articles are unnamed. He goes to correct the mistakes in his own orchard, or to learn new varieties; or he may intend planting, and goes to select the names of prize fruits from which to order, all which advantages are lost if nomenclature is disregarded.

We have given these few hints for the benefit of such exhibitors as are in the habit of finding much fault with the awarding of prizes, hoping that a consideration of these few points may help them to a more correct judgment.—*Michigan Farmer.*

MICHIGAN FLORA.

PREPARED FOR THE MICHIGAN HORTICULTURAL SOCIETY BY CHARLES F. WHEELER AND ERWIN F. SMITH, HUBBARDSTON, MICHIGAN.

PREFACE.

This list of Michigan plants was made at the suggestion of the State Horticultural Society for publication in their tenth annual report. As a foundation, the authors have collected over 1,100 species of flowering plants and ferns in various parts of the State during the past fourteen years.

They have also made use of the following earlier catalogues of Michigan plants, and tender their acknowledgments accordingly: To the First (?) Catalogue of Michigan Plants, by Dr. Jno. Wright, embracing 850 species, which appeared in Dr. D. Houghton's Second Annual Report in the year 1839, published in "Senate Documents." This was a simple list of the plants collected during one season between Detroit river and Lake Michigan, in the first and second tiers of counties, alphabetically arranged and without notes. To W. A. Burt's Manuscript List of 185 species, from the central part of the Upper Peninsula, collected while running township lines in 1844, and identified by Dr. D. Cooley. To W. D. Whitney's "List of Plants of the Upper Peninsula," with notes, published in the second volume of Foster & Whitney's Report, in the year 1851, and comprising 417 species of plants, collected chiefly along the shore of the Great Lakes. To a "Manuscript List of the Plants Growing Spontaneously within Ten Miles of Cooley's Corners, Washington, Macomb County," which embraces 900 species of flowering plants and ferns, and was prepared for the Smithsonian Institute by Dr. D. Cooley in 1853. To N. H. Winchell's "Catalogue of Phænogamous and Acrogenous Plants found Growing Wild in the Lower Peninsula of Michigan and the Islands at the Head of Lake Huron," published in Prof. A. Winchell's "Geological Report" for 1860, and containing notes on distribution, frequency, etc. Cooley's plants form part of the Herbarium of the State Agricultural College. Wright's and Winchell's plants are in the State University Herbarium.

We also owe acknowledgments to the compilers of the following more recent Catalogues of Michigan Plants: To N. Coleman's List, published in 1874, by the Kent Scientific Institute, at Grand Rapids. To Miss E. C. Allmendinger's List of Ann Arbor Plants, which appeared in 1876. To Dr. A. B. Lyons' "Medicinal Plants Indigenous in Michigan,"—a paper read before the Detroit Academy of Medicine, Nov. 27, 1877. To a "List of Native Medicinal Plants of Michigan," prepared by Prof. Volney M. Spalding, of the University of

Michigan, and published in the Proceedings of the Michigan Pharmaceutical Association in 1877. To a List of Michigan Plants, compiled by Dr. Elmore Palmer, in 1877.

Our acknowledgments are due to Prof. W. J. Beal, of the Michigan Agricultural College, for valuable assistance rendered. To Dr. D. Clark, of Flint, for specimens, and for a list of the plants of his vicinity. To Henry Gillman, Esq., of Detroit, for a list of Lake Superior plants collected by him. To Rev. E. J. Hill, of Engelwood, Ill., for lists and specimens from various localities along the east shore of Lake Michigan. To L. H. Bailey, Jr., of South Haven, for lists and specimens of plants growing in the vicinity of Lansing and South Haven.

More than a passing tribute is due to the little band of indefatigable naturalists of the past generation, who did so much pioneer work in developing all the resources of our fair State. First among them stands Dr. Douglass Houghton, while around him, among others, may be grouped the botanists, Dr. Zina Pitcher, Dr. Abram Sager, Dr. Dennis Cooley, and Dr. Daniel Clark, of whom alone Dr. Clark remains, full of years and still active in the pursuit of his favorite science. Miss Mary H. Clark, of Ann Arbor, was also well known, especially to the younger botanists of the State, as a life-long worker in this department of natural history, and one whose zeal and enthusiasm burned steadily through advancing years and only went out with her life.

Others have been connected, more or less, with the botanical interests of the State, either as teachers or collectors, among whom may be mentioned Prof. Geo. Thurber, Prof. A. N. Prentiss, and Prof. J. C. Holmes, of Detroit, all formerly connected with the State Agricultural College; Prof. M. W. Harrington, of the State University; O. B. Wheeler, Esq., of Detroit; Frank H. Tuthill, of Kalamazoo; and Rev. J. Shaup, of Hastings, Barry county.

In connection with the catalogue proper, the following hasty sketch of the main features of our flora may be of some interest. It is offered, however, *only as a sketch*, and is drawn chiefly from our own field-notes, jotted down during many a delightful ramble. The best part of botany, after all, is not in the books, and to any who find the following pages dry, we commend nature herself—that boundless, outdoor life, whose interest, beauty, and mystery is with us from the cradle to the grave, forever stimulating inquiry, and ever richly rewarding patient and loving toil.

The climate of the Upper Peninsula of Michigan is colder than that of the Lower Peninsula, the surface is considerably broken, especially in the western part, and the flora is in many respects decidedly northern, resembling in part that of British America, and in other respects like that of N. New England and Canada. Pines, firs, cedar, larch, junipers, elms, poplars, black ash, basswood, maples, and birches, are the principal trees. *Pinus strobus*, the prevailing species southward, is here largely supplanted by its more northern and less valuable congener, *P. resinosa*, whose tall, slim trunks are, however, in good demand for driving piles. Under-shrubs, like *Rubus Nutkanus* and *Taxus baccata*, var. *Canadensis*, are common, and indicate a tendency toward northern types that we find more strongly developed in the herbaceous plants. Among the latter we note as found rarely, or not at all, in the Lower Peninsula, but frequently northward, and often having a high northern range, such plants as *Anemone parviflora*, *Viola Selkirkii*, *Potentilla frigida*, *Stellaria borealis*, *Saxifraga aizoon*, *S. tricuspidata*, *Pinguicula vulgaris*, *Castilleja pallida*, *Halenia deflexa*, *Physalis grandiflora*, *Tofieldia palustris*, *Salix adenophylla*, *Eriophorum alpinum*, *Aspidium fragrans*, etc., etc.

The influence of climate on vegetation may be summed up in a few words. The climate of the Lower Peninsula is not as severe as that of the Upper, nor so even, but is subject to frequent, sudden, and extreme changes of temperature—as great a variation during the winter season as 53° Fahr. in less than 24 hours having been recorded. Such rapid changes more or less affect vegetation, especially the tender branches of cultivated trees, which are sometimes seriously injured. In one or two instances a like effect on our forest trees has been noticed. The annual range of temperature is about 116°, and the annual mean 46°. Of rain-fall, including what falls in form of snow, we have, yearly, about thirty inches. Our snow-fall is much less, for the same latitude, than that of New York and New England. In the center of the peninsula, we seldom have more than a few inches at a time.

The proximity of the Great Lakes exerts a marked influence in equalizing the temperature and the effects are marked upon our flora.

Trees like *Liriodendron Tulipifera*, *Asimina triloba*, *Cercis Canadensis*, *Gleditschia triacanthos*, *Cornus florida*, *Nyssa multiflora*, and *Morus rubra*, which belong to Ohio and Central Illinois, have crept northward, favored by the mild influence of the lake winds, through the central and western part of the Lower Peninsula, often beyond the middle, and the same is true of smaller and less noticeable plants.

As might be expected from the uniform surface of the peninsula, the flora is much alike throughout. Probably three-fourths of our species are common to all sections, though by no means equally distributed; some being very abundant in one district and rare in another at no great distance. In most cases such change is due to soil rather than to difference in elevation, temperature, or atmospheric moisture.

The Lower Peninsula is covered with a deep drift of alternating sands, clays, and gravels, and the flora of any section depends chiefly on which of these happens to lie uppermost. With reference to its flora, the Peninsula may be roughly divided into two great divisions—the hard-wood and the soft-wood lands; one representing the Appalachian flora, and the other, the Canadian.

The hardwood country lies south of latitude 43°, and consists of very fertile sand, clay, or loam, mostly cleared of the original forest, and largely cultivated.

The sandy or stony drift of many river valleys in this section supports a heavy growth of oak, frequently interspersed with walnut and hickory, while the margins of the streams, and the neighboring swamps, abound in soft maples, swamp and chestnut oak, white and black ash, elm, hackberry, sycamore, butternut, and similar trees. Willows, dogwoods, viburnums, and buttonbush, are common shrubs in the swamps; and hazel, hawthorn, wild cherry and plum, June berry, witch-hazel, etc., are abundant on the dryer ground.

On the uplands, and away from streams, clay, loam, and a peculiar black-muck soil, supersede the sands and gravels of the valleys. The prevailing timber here is beech and maple and oak forest in about equal proportions. Beech and maple (*Acer saccharinum* and var. *nigrum*) generally grow together, forming magnificent forests of great extent. The best wheat farms are usually found on uplands near streams, where the oak timber gradually shades into beech and maple. Plains of fertile sand covered with a low, or scattering growth of oak (oak openings) are frequent, and always very desirable for farming purposes. Four species of oak are usually found on such plains—*Q. alba*, *macrocarpa*, *coccinea*, and *tinctoria*.

Marshes densely covered with tamarack are common in this part of the State, and nourish in their thick shade such plants as *Drosera rotundifolia*, *Sarracenia purpurea*, *Rhus venenata*, *Ribes rubrum*, *Chiogenes hispidula*, *Salix candida*, *Smilacina trifolia*, *Pogonia ophioglossoides* and *Calopogon pulchellum*. Arborvitæ, red cedar and black spruce are comparatively rare.

A similar tract of soil and timber occurs in the upper end of the Peninsula, north of a line drawn from Thunder Bay west to the head of Grand Traverse Bay. This is commonly known as the "Traverse Region," and has a flora much like that we have just described, with the exception that some of the southern species disappear, and northern ones begin to take their place, or if found growing further south, here first become frequent.

The littoral flora of Little Traverse Bay is rich in interesting species, among which may be mentioned a small form of *Cakile Americana*, *Lathyrus maritimus*, *Potentilla Anserina*, *Tanacetum Huronense*, *Artemisia Canadensis*, *Cnicus Pitcheri*, *Juncus Balticus*, *Triticum violaceum*, *T. dasycarpum*, a peculiar form of *Bromus ciliatus*, *Calamagrostis longifolia*, *C. arenaria*, and *Equisetum variegatum*. The flora of the low dunes at the head of the Bay comprises, among others, the following species: *Juniperus Sabina*, var. *procumbens*, *Prunus pumila* and *Cornus stolonifera*, half buried in the drifting sand, *Hypericum Kalmianum*, *Salix glaucophylla*, and varieties, *Lilium Philadelphicum*, etc. In a moist depression were found *Arabis lyrata*, *Coreopsis lanceolata*, *Arctostaphylos Uva-ursi*, *Primula farinosa*, *Lithospermum hirtum*, *Triglochin maritimum*, var. *eltatum*, *Carex aurea*, *C. Oederi*, etc., etc. In thickets near the shore were found *Abies balsamea*, *Picea alba*, *Shepherdia Canadensis*, and *Rubus Nutkanus*. Deep forests of hemlock and yellow birch (*B. lutea*) mixed with a fine, tall growth of striped maple (*A. Pennsylvanicum*) are frequent, having underneath a tangled growth of *Taxus baccata*, var. *Canadensis*, and under all a carpet of *Lycopodium annotinum*. Alternating with these are sandy plains covered with a dense growth of *Vacciniums*, yielding a great abundance of fruit. Sugar maples and basswood are also abundant in this region, and reach an immense size. In fact, finer groves of maple it would be difficult to find in any part of the State.

The pine country proper lies between the two tracts we have described, and embraces about 15,000 square miles. It is composed largely of sand hills and plains, either scantily furnished with vegetation, or densely covered with pine forest. Argillaceous tracts wooded with beech and maple also occur, like oases in a desert; and swamps abound, with the usual lowland timber. Forests of hemlock spruce are frequent, and there are occasional ridges of oak. Birch (*B. lutea*) also begins to be a common forest tree, and attains a large size. The usual timber of the barrens is Jack Pine (*P. Banksiana*). Climatic and other influences have combined to produce groves composed entirely of this species of large size and of great beauty, for, instead of being "a straggling shrub, or low tree" (Gray), it rises, often 50-60 feet, straight and symmetrical. All through this region *Pinus strobus* is the prevailing species and furnishes most of the lumber, but *P. resinosa* is frequent as far south as Clare county, and occurs sparingly in the northern part of Isabella county, which appears to be its southern limit.

Such is the general character of the sylvia down to about latitude 43°, but in the western part of the State, owing perhaps to moister climate, or to favorable soil, hemlock spruce is more abundant, and reaches much farther south, nearly or quite to the Indiana line, and the same is true of white pine.

Portions of the counties of Clare, Missaukee, and Roscommon represent an undulating plateau, which is 700-800 feet above the level of the great lakes,

and has an interesting flora, as yet little studied. This region was examined in June, 1876, and revealed a number of northern plants. In the southern part of Clare county were found *Ledum latifolium*, *Kalmia glauca*, *Physalis grandiflora* (not before found south of the Upper Peninsula), *Corydalis glauca*, and *Geranium Carolinianum*,—the two latter species growing luxuriantly in the deep woods, after fires. In the shade of the Jack Pines grew *Prunus pumila*, *Potentilla tridentata* (not before observed in Lower Peninsula), *Krigia Virginica*, *Arctostaphylos Uva-ursi*, *Linaria Canadensis*, *Kæleria cristata*, *Carex Houghtonii*, etc., etc. Near Houghton Lake were found *Adlumia cirrhosa*, *Ribes lacustre*, *Dracocephalum parviflorum*, *Streptopus roseus*, and *S. amplexifolius*; and in Muskegon river, near its source, *Potamogeton lucens*. *Pinus resinosa* was noticed frequently, growing with common pine, and near the center of Clare county it became more abundant, forming groups. Single individuals stretch upwards 150–160 feet, their clean, copper-colored boles often rising 100 feet to the first limbs.

The flora of the deep pine woods is interesting, though rather monotonous. Very little undergrowth is found, and their gloomy recesses nourish only such plants as love thick shade. Here the club-mosses (*Lycopodiums*) find a congenial home, and flourish luxuriantly, while *Clintonia borealis* covers the ground. The great round-leaved orchid (*Habenaria orbiculata*), with its tall, greenish spike and twin leaves close to the earth, is also frequent and striking. We shall also meet *Mitchella repens*, *Smilacina bifolia*, *Trillium grandiflorum*, perhaps, and a few ferns, particularly *Asplenium Filix-femina*, and *Phegopteris Dryopteris*. Other species occur, of course, but not so abundantly. In more open places, and on ridges, we meet *Rhus aromatica* and *Comptonia* along with wintergreen (*Gaultheria*) and trailing arbutus (*Epigæa*), and are often fortunate enough to find the wax-white, fragrant flower of *Moneses uniflora*, or *Polygala paucifolia*, hiding its shining leaves under a wealth of showy pink blossoms.

The floral treasures of the pine region lie, however, in its swamps and lake borders rather than in the deep woods. Therein grows *Linnea borealis* in all its delicate beauty, carpeting the ground, and close at hand, the odd, brown-purple flower of *Cypripedium acaule* and the small yellow blossom of its water-loving relative *C. parviflorum*. In such swamps, or within a stone's throw of them, may be found many other plants of equal interest, such as *Medeola Virginica*, *Ledum latifolium*, *Andromeda polifolia*, *Kalmia glauca*, *Lonicera oblongifolia*, *Cardamine pratensis*, *Gerardia aspera*, *Mitella nuda*, *Eriophorum vaginatum*, etc. On lake margins we shall find *Lysimachia* and the blue *Pontederia* and more rarely, *Nesaea* and *Eleocharis quadrangulata*. The lake itself, most likely, will be full of *Nymphæa*, *Nuphar*, *Utricularias*, and a world of *Potamogetons* and similar water weeds. Shrubby *Vacciniums* line the bluffs, and here and there gleam the white trunks of paper birches against the dark background of pines.

In the thick-pine country, where the lumberman's axe has let in the sunlight, new plants spring up freely. Here, *Prunus Pennsylvanica* and poplars are frequent, and the blackberry is omnipresent. *Aralia hispida* and *Physalis pubescens* are also peculiar to such land, and in August *Gnaphalium decurrens* may be seen whitening thousands of acres.

One seldom beholds a drearier sight than a dead and deserted lumber region. The valuable trees were all felled years ago, and the lumberman moved on to fresh spoils, leaving behind an inextricably confused mass of tree tops, broken logs, and uprooted trunks. Blackberry canes spring up

everywhere, forming a tangled thicket, and a few scattering poplars, birches, and cherries serve for arboreal life, above which tower the dead pines, bleached in the weather and blackened by fire, destitute of limbs, and looking at a distance not unlike the masts of some great harbor. Thousands of such acres, repellant alike to botanist and settler, can be seen in any of our northern counties.

In certain districts considerable beech is found associated with the pine. The soil of such tracts is usually of better quality, and can be rendered productive without much labor. It may be noted that in such cases the pine also grows thriftier and makes better lumber.

Sections of this and the Traverse region of Michigan are still sparsely settled, or not at all, and have been visited rarely by botanists. Consequently, we may expect many additions to our flora, as well as corrections, when this region is as thoroughly known as the south half of the State now is; our ignorance, rather than nature's parsimony, explaining why we have so few species credited to us. The most promising field for the botanist evidently lies in the Houghton Lake region and northward, and in the Upper Peninsula, many parts of the interior of which are botanically unknown.

Our flora, as here presented, contains in all 113 families (orders) and 1,634 species. The composites claim the largest number of species, 182—about one-ninth of all. Sedges follow with 176 species; grasses, 139; rosaceæ, 61; ferns, 56; leguminosæ, 55; figworts, 46; mints, 40; mustard and crowfoot, 39 each; heath family, 35, and umbelliferæ, 27. We have 165 trees and shrubs, about 20 of which are valuable timber trees. At least 40 of our trees and shrubs are worthy of cultivation for ornament. Sugar maples and elms are commonly planted, while the tulip tree, basswood, Kentucky coffee tree, black walnut, and butternut, among deciduous trees, and hemlock, white pine, black spruce, arbor vitæ, and red cedar, among evergreens, deserve more attention. About 20 species of woody and herbaceous native climbers are frequent, and some are worthy of cultivation, (see State Pomological Report of '79 for a list.) Ninety medicinal plants are admitted into the U. S. Pharmacopœia, 45 belonging to the primary list, and an equal number to the secondary, while a number of others deserve attention at the hands of Pharmacists. (See papers previously noted.)

It may be stated in conclusion that, in the preparation of this catalogue, we have spared no pains to make it thoroughly reliable, a majority of the species enumerated having passed through our hands, and the remainder being admitted only on good authority. We have preferred to make a *useful* rather than a *large* catalogue, and, on this ground, we have rejected a number of species, some of which may yet make good their claim to be considered as part of our flora. We cannot hope to have escaped all errors, and crave charitable judgment for any such the kind reader may discover, trusting that they may be found errors of omission rather than of commission.

In our arrangement of orders, we have preferred, as more convenient, to follow the 5th edition of Gray's Manual rather than later works. The vexatious subject of synonymy has received considerable attention, and will, we believe, be found brought down nearly to date. Further observations will be published from time to time in the form of addenda, towards increase of which we solicit correspondence and contributions from all parts of the State.

Ionia, Mich., January 30, 1881.

CATALOGUE.

Range of species north or south, when known, has been indicated by the following abbreviations in bold type at the right: S.—1st, 2d, and 3d tier of counties. C.—From 3d tier of counties northward to Houghton Lake region. N.—Remainder of the Lower Peninsula. L. P.—Lower Peninsula. U. P.—Upper Peninsula. Th.—Whole State so far as known. In a few instances S. E. and S. W. have been used, indicating the southeastern and southwestern slope of the Lower Peninsula. In case of rare or local species, we have given all the localities known, but for more common ones have usually indicated only the range and relative frequency. Throughout the catalogue: H. refers to Hubbardston, situated on Fish Creek, in the extreme northeastern part of Ionia Co.; Flint,—Dr. Clarke's List; Macomb Co.,—Dr. Cooley's MS. Cat.; So. Haven,—L. H. Bailey's List; Kalamazoo,—F. H. Tuthill; Detroit,—Dr. A. B. Lyons. Other abbreviations of this nature, as Winch. Cat., Wr. Cat., Allmend. Cat., etc., will be readily understood from the preface. The (!) used after rare or local species indicates that we have collected the plant in the locality given, or have received it from others. A mark of doubt (?) follows a few species which we have introduced with some hesitation and on the authority of others. In most cases such species have been dropped altogether. Medicinal plants have been indicated by asterisks as follows: Those belonging to the Primary List of the U. S. Pharmacopœia (*); Secondary List (**); not official but in use, or worthy of trial (***). Introduced species are given in *Italics*, and are chiefly weeds from the Old World.

 RANUNCULACEÆ.
(Crowfoot Family.)

CLEMATIS

- | | | |
|--------------------|---|-----|
| Virgin's
Bower. | 1. <i>Virginiana</i> , L. (***) | Th. |
| | Sometimes cultivated as a climber. The plumose white fruit ornamental.
Common. | |

ANEMONE

- | | | |
|--|---|----------------|
| Small-flow-
ered A. | 2. <i>parviflora</i> , Mx. | U. P. |
| | Dr. Lyons; Asa Gray. | |
| Long-fruited
A. | 3. <i>cylindrica</i> , Gray. | L. P. |
| | | Infrequent. |
| Virginian A. | 4. <i>Virginiana</i> , L. | Th. |
| | | Frequent. |
| Many-cleft A. | 5. <i>multifida</i> , Poir. | |
| | Mackinaw,—Whitney Cat.; mouth of Saginaw R.
Winchell Cat.; Lake Superior,—Gray. | |
| | | Rare. |
| Pennsylvania-
nian Anem-
one. | 6. <i>dichotoma</i> , L. | Th. |
| | On low ground along streams, and worthy of cultivation. The handsome,
white flowers are sometimes over two-inches in diameter, and the size
could probably be increased by cultivation. | |
| | | Common. |
| Wind Flower.
Wood Anem-
one. | 7. <i>nemorosa</i> , L. (***) | Th. |
| | Early and very pretty. Flowers sometimes bright rose color. Common. | |
| Liverleaf.
Acute-lobed
Hepatica. | 8. <i>acutiloba</i> , Lawson. | S. C. & N. (?) |
| | This species is very common on beech and maple land, while <i>A. Hepatica</i>
prefers oak soil. No transition forms have been seen. | |
| Liverleaf.
Round-lobed
Hepatica. | 9. <i>Hepatica</i> , L. | Th. |
| | Less frequent than the preceding, at least in the center. | |

THALICTRUM

- | | | |
|-------------------|---|---------|
| Rue Anem-
one. | 10. <i>anemonoides</i> , Mx. | S. & C. |
| | Quite local through the center. Flowers very pretty, white, sometimes
pink. Found usually on oak soil. | |

- Early Meadow Rue. 11. *dioicum*, L. Th.
Early. Worth cultivating for its delicate, glaucous-green foliage. Common.
- Purplish M. Rue. 12. *purpurascens*, L. Th.
The flowers vary from white to deep purple, the fertile ones occasionally bearing stamens as in the next. Wet meadows. Occasionally Common.
- Tall M. Rue. 13. *Cornuti*, L. Th.
Often confounded with the preceding. Frequent.

RANUNCULUS

- Stiff Water Crowfoot. 14. *aquatilis*, L., var. *stagnatilis*, DC. Th.
Bear River, Petoskey—E. J. Hill; Ann Arbor—Allmendinger Cat.; Huron R.—Lyons; etc. Infrequent.
- White Water Crowfoot. 15. *aquatilis*, L., var. *trichophyllus*, Chaix. Th.
Common.
- Yellow Water Crowfoot. 16. *multifidus*, Ph. Th.
Flowers an inch and three-eighths in diameter and full—double have been seen. Ponds and slow streams. Very common.
17. *multifidus*, Ph., var. *terrestris*, Gr.
Ann Arbor,—Miss Clark.
- W. Plantain Spearwort. 18. *ambigens*, Watson. Th.
Dr. Lyons. Not observed in C. & S.
- Creeping Spearwort. 19. *flammula*, L., var. *reptans*, Meyer. Th.
Infrequent except northward, and not seen in the center of the State.
- Early Crow-foot. 20. *rhomboides*, Goldie. Th.
On light sand; our earliest spring flower. Muir and Palo in Ionia county (!); Lake Superior.—Can. Cat. "Prairies, Mich."—Gray. Rare.
- Spring Crow-foot. 21. *abortivus*, L. Th.
Common.
- Small-flow-ered C. 22. *abortivus*, L., var. *micranthus*, Gr. Th.
- Cursed C. 23. *sceleratus*, L. (***) Th.
Ditches and low ground. Exceedingly variable, stems sometimes two inches in diameter. Frequent.
- Hooked C. 24. *recurvatus*, Poir. Th.
Woods in rich soil. Common.
- Bristly C. 25. *Pennsylvanicus*, L. Th.
Frequent.
- Early C. 26. *fascicularis*, Muhl. Th.
Pretty and worth trying in the garden. Flowers sometimes double, or with reversion of essential organs to leaves. Hills and sandy plains. Common.
- Creeping C. 27. *repens*, L. (***) Th.
Wet places. Very common.
- Butter-cups. 28. *acris*, L. (***) Th.
"Classed by Hooker f. as indigenous,"—Watson. So. Haven; Macomb Co.; Flint; Huron shore—Winch. Cat.; and Lake Superior. Infrequent.

ISOPYRUM

- Isopyrum. 29. *bitermum*, T. & Gr. (***) C. & S.
False Rue Early and pretty. Often mistaken for Rue Anemone, from which the Anemone. latter is easily distinguished by its dahlia-like roots. Very common on "beech and maple" land, but not on oak.

CALTHA

- Marsh Marigold. 30. *palustris*, L. Th.
In swamps. Frequently called "Cowslip," and eaten in spring for greens. Very common.

TROLLIUS

- Globe-flower. 31. *laxus*, Salisb.
 "Deep swamps, Mich."—Gray. Very rare.

COPTIS

- Goldthread. 32. *trifolia*, Salisb. (π) Th.
 Bogs and coniferous woods. Common.

AQUILEGIA

- Wild Colum- 33. *Canadensis*, L. Th.
 bine. A stately plant, desirable for cultivation on account of its large, scarlet
 and yellow flowers. Common.

DELPHINIUM

- Tall Lark- 34. *exaltatum*, Ait. (***) S.
 spur. "Michigan and southward."—Gray. S. Michigan is probably the northern
 limit of this species east of the Mississippi. Rare.

HYDRASTIS

- Yellow Puc- 35. *Canadensis*, L. (*) C. & S.
 coon. Orange- Rich, moist woods. Rather local.
 root. Golden
 Seal.

ACTÆA

- White Bane- 36. *alba*, Bigelow. (***) Th.
 berry. Moist woods and hillsides. Abundant.
- Red Bane- 37. *spicata*, L., var. *rubra*, Aiton. (***)
 berry. Less frequent than the preceding. Berries of both are ornamental.

CIMICIFUGA

- Black Snake- 38. *racemosa*, Nutt. (*) S.
 root. S. E.—Winch. Cat.; U. P.—Burt. (?). Rare in Michigan, and probably
 Black Cohosh. does not get much beyond Northern Ohio.

NIGELLA

- Fennel- 39. *Damascena*, L. (***)
 flower. Escaped from gardens. Infrequent.

MAGNOLIACEÆ.

(*Magnolia Family.*)

LIRIODENDRON

- White-wood. 40. *Tulipifera*, L. (**) C. & S.
 Tulip-tree. A medium sized tree, frequent at Ionia (!), Saranac (!), Lansing (!), and
 southward, but not seen north of Grand river valley. This is one of our
 finest native trees, valuable alike for lumber and ornamental purposes.
 Formerly common but becoming Infrequent.

ANONACEÆ.

(*Custard-Apple Family.*)

ASIMINA

- Pawpaw. 41. *triloba*, Dunal. (***) C. & S.
 A low tree, fruit scarcely edible. Abundant in the valleys of Grand and
 Maple rivers, where it probably reaches its N. limit. Common south-
 ward.

MENISPERMACEÆ.

(*Moonseed Family.*)

MENISPERMUM

- Moonseed. 42. *Canadense*, L. (***) C. & S.
 Woods and moist thickets. Common.

BERBERIDACEÆ.

(Barberry Family.)

BERBERIS

- Common Bar- 43. *vulgaris*, L. (**)
berry. Flint, etc. Rare.

CAULOPHYLLUM

- Blue Cohosh. 44. *thalictroides*, Mx. (***) Th.
Common in L. P.

JEFFERSONIA

- Twin-leaf. 45. *diphylla*, Persoon. (***) C. & S.
Rheumatism- An early spring plant. Worth cultivating for its white flowers and curi-
root. ous biparted leaves. Infrequent.

PODOPHYLLUM

- Mandrake. 46. *peltatum*, L. (*) C. & S.
May-apple. Roots drastic, an article of commerce. Ripe fruit often eaten.
Very common.

NYMPHÆACEÆ.

(Water-Lily Family.)

BRASENIA

- Water-shield. 47. *peltata*, Pursh. C. & S.
Greenville (!), Ionia (!), Lansing (!), Ann Arbor, etc. Infrequent.

NELUMBium

- Rattle-box. 48. *luteum*, Willd. S.
Yellow Nel- River Rouge, south of Detroit; Indian Lake, 12 miles southeast of Kala-
umbo. mazoo; Monroe county, where it is abundant; and probably in other
Water Chin- places. Seems to be indigenous. Local.
nepin.

NYMPHÆA

- Sweet-scented 49. *odorata*, Aiton. (***)
Water-Lily. Said to grow at Ann Arbor—Allmend, Cat.—and in Lake Superior region,
but the next has probably been mistaken for it, unless the two run
together.
- White Water- 50. *tuberosa*, Paine. (***) C. & S.
Lily. In all our ponds and slow streams. Flowers large and delicately beauti-
ful, fragrant; often used for decorating in connection with evergreens.
Easily propagated from the tubers, and desirable for large aquariums
in grounds. Common.

NUPHAR

- Spatter Dock. 51. *advena*, Aiton. (***) Th.
Yellow Pond- In company with water-lilies, but always a dirty plant—seeming to de-
Lily. light in filth. Common.
- Small Yellow 52. *pumilum*, Smith. C. & S.
Pond Lilly. "Sag. Bay & S. W."—Winch. Cat. Infrequent.

SARRACENIACEÆ.

(Pitcher-Plants.)

SARRACENIA

- Pitcher Plant. 53. *purpurea*, L. (***)
Common in sphagnum swamps. Can be grown in the house, where it
always attracts attention as a "curiosity," though all the swamps in
the neighborhood be full of it.

PAPAVERACEÆ.

(Poppy Family.)

- Mexican Poppy. Prickly P. ARGEMONE
54. *Mexicana*, L. (***)
- Celandine. CHELIDONIUM
55. *majus*, L. (***)
- Common Poppy. PAPAVER
56. *somniferum*, L. (*)
- These three plants occur in some localities, but are scarcely well enough established to deserve mention.
- Blood-root. SANGUINARIA
57. *Canadensis*, L. (*) Th.
- The white flowers appear in early spring, and are sometimes $2\frac{1}{2}$ inches in diameter. Does well in gardens, and is pretty. Common.
- Yellow Poppy. Celandine Poppy. STYLOPHORUM
58. *diphyllum*, Nutt. (***) C. & S.
- Rich woods in Oceana, Ionia, Clinton, Ingham, and other counties. Flower orange-yellow, over two inches in diameter. Deserves a place in the garden. Rare or Local.

FUMARIACEÆ.

(Fumitory Family.)

- Climbing Fumitory. ADLUMIA.
59. *cirrhusa*, Raf. C. & S.
- Hemlock woods in vicinity of Houghton Lake; Grand Rapids,—Miss Clark So. Haven; etc.; also in cultivation. Not com.
- Golden Corydalis. CORYDALIS.
60. *aurea*, Willd. Th.
- Not noticed in the center of the L. P., where the next is also rare; frequent northward; in the U. P., common.
- Pale C. 61. *glauca*, Pursh. Th.
- Grand Haven(!); Clare Co.(!); L. Sup., etc. Infrequent except northward.
- Squirrel Corn. DICENTRA.
62. *Canadensis*, DC. (***) C. & S.
- Dutchman's Breeches 63. *cucullaria*, DC. (***) C. & S.
- Both sp. common.

CRUCIFERÆ.

(Mustard Family.)

- Alyssum. ALYSSUM.
64. *calycinum*, L. C. & S.
- Hubbardston (!); Ionia (!); Flint; Lansing (!), etc.; a recently introduced plant, becoming common in many localities. Door-yards and waste places.
- Rock Cress. ARABIS.
65. *dentata*, T. & Gr. C. & S.
- Low lands along Grand R. (!) and southward. Not common.
- Rock C. 66. *lyrata*, L. Th.
- So. Haven; Flint; Petoskey (!); U. P.—Whitney Cat. Infrequent.
- Rock C. 67. *petræa*, Lam. Th.
- Isle Royal—Gillman; Mackinac; Macomb Co.; Gd. Haven; etc. Infrequent

Hairy Rock C.	68. <i>hirsuta</i> , Scop.	Th. Frequent.
Smooth Rock C.	69. <i>laevigata</i> , Poir.	Th. Infrequent.
Canada Cress. Sickle-Pod.	70. <i>Canadensis</i> , L. Fields and rocky woods.	C. & S. Common.
Tower Mustard.	71. <i>perfoliata</i> , Lam.	Th. Not rare.
Drummond's M.	72. <i>Drummondii</i> , Gr. Hubbardston(!); Flint; Macomb Co.; etc. Dry banks.	Th. Not com.
BARBAREA		
Yellow Rock- et. Winter Cress.	73. <i>vulgaris</i> , R. Br. So. Haven; Ann Arbor—Allmendinger Cat.; Macomb Co.; Hubbardston(!); and N. into the U. P., where it is indigenous and frequent.	Th.
BRASSICA		
White Mustard.	74. <i>alba</i> , Gr. (*)	C. & S. Infrequent.
Charlock.	75. <i>Sinapistrum</i> , Boiss.	Th. Not com.
Black Mustard.	76. <i>nigra</i> , Koch. (*)	C. & S. Common.
CAKILE		
Sea Rocket.	77. <i>Americana</i> , Nutt. Shores of the Gr. Lakes.	Th. Common.
CAPSELLA		
Shepherd's Purse.	78. <i>Bursa-pastoris</i> , Mönch. (***) The commonest of weeds.	Th.
CARDAMINE		
Spring Cress.	79. <i>rhomboidea</i> , DC.	Th. Common.
Purple Spring C.	80. <i>purpurea</i> , Cham. & Schlecht. An early spring flower.	Th. Common.
Cuckoo Flower.	81. <i>pratensis</i> , L. (***) Bogs. Rare S., frequent in C., and common N.	Th.
Small Bitter Cress.	82. <i>hirsuta</i> , L.	Th. Common.
Woodland B. C.	83. <i>hirsuta</i> , L., var. <i>sylvatica</i> , Gr. Ann Arbor,—Winch. Cat.; and Flint.	C. & S. Infrequent
DENTARIA		
Crinkle-root. Pepper-root.	84. <i>diphylla</i> , Mx. (***)	Th. Common.
Tooth-wort.	85. <i>laciniata</i> , Muhl. Probably occurs farther north if not throughout.	C. & S. Common.
DRABA		
Whitlow-grass.	86. <i>arabisans</i> , Mx. Shores of the Gr. Lakes.	Th. Infrequent.
Whitlow-grass.	87. <i>memorosa</i> , L. "Fort Gratiot and northwestward,"—Gray. Collected by Dr. Pitcher.	Th. Infrequent.
Whitlow-grass.	88. <i>Caroliniana</i> , Walt. Ionia Co. (!), and southward.	C. & S. Rare.
Whitlow-grass.	89. <i>verna</i> , L. Dr. Lyons.	S. Rare.

LEPIDIUM

- Wild Pepper-grass. 90. *Virginicum*, L. Th.
 Wild P.-grass. 91. *intermedium*, Gr. Th.
 This and the preceding are both very common in fields and waste places, but usually not together.
 Pepper-wort. 92. *campestre*, R. Br. S. E.
 Macomb Co., and Detroit. Infrequent.

NASTURTIUM

- True Water-Cress. 93. *officinale*, R. Br. (***) C. & S.
 Ionia(!); Ann Arbor; South Haven; etc. Frequent in brooks.
 Marsh Cress. 94. *palustre*, DC. (***) Th.
 Frequent.
 Hairy M. Cress. 95. *palustre*, DC., var. *hispidum*, Fisch. & Mey. Th.
 Lake Cress. 96. *lacustre*, Gr. C. & S.
 From Fish Cr. (!) and Maple R. (!) southward. Frequent.
 Horseradish. 97. *Armoracia*, Fries. (***)
 Used in spring as a condiment. Escaped from gardens into waste places. Frequent.

SISYMBRIUM

- Hedge Mustard. 98. *officinale*, Scop. (***)
 Road-sides and wet places. Frequent.
 Mouse-ear Cress. 99. *Thaliana*, Gay. C. & S.
 In light sand; generally mistaken for *Arabis lyrata*. Common.
 Tansy Mustard. 100. *canescens*, Nutt. Th.
 Shores of Gr. Lakes, etc. Pitcher, Houghton, Winchell, *et al.* Infrequent.

CAMELINA

- False Flax. 101. *sativa*, Crantz. C. & S.
 Road-sides and waste places. Flint; Ann Arbor; Macomb Co.; etc. Not common.

THALASPI

- Penny Cress. 102. *arvense*, L. S. E.
 Ann Arbor—Allmend Cat.; "Shores of Lake Huron."—Gray. Rare.

CAPARIDACEÆ.

(Caper Family.)

POLANISIA

- Polonia. 103. *graveolens*, Raf. S.
 Shores of Gr. Lakes; South Haven; Detroit (!); Put-in Bay (!), etc. Not rare.

VIOLACEÆ.

(Violet Family.)

IONIDIUM

- Green Violet. 104. *concolor*, Benth. & Hook. C. & S.
 Hubbardston (!); Lansing—Beal; Ann Arbor,—Allm. Cat.; etc. Scarce and local.

VIOLA

- Round-leaved Violet. 105. *rotundifolia*, Mx. U. P.
 Sugar Island—Winch. Cat.; Michigan—Gray.
 Selkirk's V. 106. *Selkirkii*, Pursh. U. P.
 Great-spurred V. Gillman, Gray, *et al.* A high northern plant.

Sweet White V.	107. <i>blanda</i> , Willd.	Th. Common and variable.
Lance-leaved V.	108. <i>lanceolata</i> , L. Roscommon Co.(!); L. Sup.; etc.	Rare. Th.
Common Blue V.	109. <i>cucullata</i> , Aiton.	Common and variable.
Hard-leaf V.	110. <i>cucullata</i> , Ait., var. <i>palmata</i> , Gr. Frequent on hills about Ionia.(!)	
Arrow-leaved V.	111. <i>sagittata</i> , Aiton. Rare in some sections, common in others.	C. & S.
Larkspur V.	112. <i>delphinifolia</i> , Nutt.(?)	S.
Bird-foot V.	113. <i>pedata</i> , L. (**) Common on light sand, our finest species. Does nicely in cultivation and deserves attention. The flowers are light blue, or very rarely pure white, and are very pretty, being often $1\frac{1}{2}$ in. in diameter. N. to "British Am., lat. 55°."—Torr. & Gr., Fl. N. Am.	Th.
Dog Violet.	114. <i>canina</i> , L., var. <i>sylvestris</i> , Regel.	Th. Common.
Long-spurred V.	115. <i>rostrata</i> , Muhl. Well distributed and frequent.	C. & S.
Pale V.	116. <i>striata</i> , Aiton.	C. & S. Common.
Canada V.	117. <i>Canadensis</i> , L. Abundant on "beech and maple" land, but seldom, or never, under oaks.	Th.
Downy Yellow V.	118. <i>pubescens</i> , Aiton.	Th. Common.
Hairy Yellow V.	119. <i>pubescens</i> , Ait., var. <i>eriocarpa</i> , Nutt.	Th. Common.
Woolly-fruited V.	120. <i>glabella</i> , Nutt. Hubbardston(!); etc.	C. & S. Infr.

CISTACEÆ.

(Rock-rose Family.)

Frost-weed. Frost-wort.	121. <i>Canadense</i> , Mx. (**)	Th. Frequent.
Hudsonia.	122. <i>tomentosa</i> , Nutt. "Shores of Gr. Lakes."—Gray; S. Mich.—Winch. Cat.; L. Sup.—Can. Cat. Infr.	Th.
Pinweed.	123. <i>major</i> , Mx. Common on poor soil.	C. & S.

DROSERACEÆ.

(Sundew Family.)

Round-leaved Sundew.	124. <i>rotundifolia</i> , L. (***) In sphagnous swamps. An insectivorous plant.	Th. Common.
Sundew.	125. <i>intermedia</i> , Drev. & Hayne, var. <i>Americana</i> , DC. S. Mich.—Wright Cat.; Ann Arbor—Allmend. Cat.; L. Sup.—Can. Cat. Infrequent.	Th.
Slender S.	126. <i>linearis</i> , Goldie. Dr. Lyons; L. Sup.—Can. Cat.	U. P.

HYPERICACEÆ.

(St. John's-wort Family.)

HYPERICUM

- Great St. John's-wort. 127. *pyramidatum*, Aiton. Th.
 South Haven; Ann Arbor; Ft. Gratiot; Macomb Co.; Ionia (!); Stanton (!); Hubbardston (!); Crystal Lk. (!); Flint; Ontonagon River—Whitney Cat. Rare.
 Occurs at wide intervals and in small patches.
- Kalm's St. J. 128. *Kalmianum*, L. Th.
 Along the lakes; more common northward. S. Mich.—Wright Cat.; Fort Gratiot—Winch. Cat.; Petoskey (!); etc.
- Shrubby St. J. 129. *prolificum*, L. Th.
 A low, compact shrub, with a profusion of bright yellow blossoms, from July to Sept. Sometimes cultivated, and worthy of more notice as a hardy flowering shrub. Frequent from C. southward.
- St. John's-wort. 130. *ellipticum*, Hook. Th.
 Ann Arbor—Miss Clark; L. Sup.—Gray. Infrequent.
- Common St. J. 131. *perforatum*, L. (***) C. & S.
 Ionia (!); Lansing (!); Flint; etc. A bad weed in the Eastern States, but not troublesome in Michigan. Infrequent.
- St. John's-wort. 132. *corymbosum*, Muhl. Th.
 Common.
- Slender St. J. 133. *multilum*, L. Th.
 Abundant.
- Canada St. J. 134. *Canadense*, L. Th.
 Ionia Co. (!); Macomb Co.; Flint; Drummond's Island—Winch. Cat. Occasional.
135. *Canadense*, L., var. *major*, Gray. Th.
 Flint; Fruitport and Old Mission.—E. J. Hill; L. Sup.—Gray.

ELODES

- Marsh St. John's-wort. 136. *Virginica*, Nutt. Th.
 Common.
- Marsh St. John's-wort. 137. *petiolata*, Ph. (?)
 Grosse Isle—Miss Clark in Winch. Cat.

CARYOPHYLLACEÆ.

(Pink Family.)

SAPONARIA

- Bouncing Bet. Soapwort. 138. *officinalis*, L. (***) L. P.
 Waste places and roadsides. Old Mission—E. J. Hill; and common in C. & S.
- Cow-Herb. 139. *vaccaria*, L. C. & S.
 Muir (!); S. Mich.—Wright Cat.; etc. Sparingly introduced.

SILENE

- Starry Campion. 140. *stellata*, Aiton. S.
 Dr. Wright.
- Wild Pink. 141. *Pennsylvanica*, Mx. (?) S.
 Mont Lake—Miss Clark in Winch. Cat. We have specimens which were sent from Springfield, O., and the plant may grow in Mich.
- Fire Pink; Catchfly. 142. *Virginica*, L. S.
 Winchell Cat.
- Sleepy Catchfly. 143. *antirrhina*, L. Th.
 Common.
- Night-flowering C. 144. *noctiflora*, L. C. & S.
 Common.

LYCHNIS

- Corn Cockle. 145. *Githago*, L. L. P.
In wheat-fields, but easily eradicated by sowing clean seed-wheat.
Common.

ARENARIA

- Thyme-leaved Sandwort. 146. *serpyllifolia*, L. Th.
Sandy fields. Not well distributed, but in places very common.
- Strict Sandwort. 147. *stricta*, Mx. Th.
S. Mich.—Wright Cat.; Macomb Co.; Montcalm Co. (!); L. Sup.—Can. Cat.
Infrequent.
- Showy Sandwort. 148. *lateriflora*, L. Th.
"From lat. 40° to the Arctic sea,"—Torrey & Gray, in "Flora N. Am."
Rather common in C., and quite pretty.

STELLARIA

- Chickweed. 149. *media*, Smith. Th.
Gardens and fields. A very abundant and hardy little weed, which has been seen in blossom every month in the year. In fact, even in mid-winter, a few warm days are enough to set it growing.
- Long-eared Stitchwort. 150. *longifolia*, Muhl. Th.
Common.
- Swamp S. 151. *uliginosa*, Murr. U. P.
Dr. Lyons.
Infr.
- Starwort. 152. *crassifolia*, Ehrh. Rare.
Dr. Lyons.
- Northern S. 153. *borealis*, Bigelow. U. P.
Point au Barques, L. Huron, and Isle aux Traine, L. Sup.—Gillman; also, Gray in Manual, and Can. Cat.
Infrequent.
- Long-stalked Stitchwort. 154. *longipes*, Goldie, N. & U. P.
"Gros Cap, L. Mich., abundant in pure sand."—Winch, Cat. Rare.

CERASTIUM

- Mouse-ear Chickweed. 155. *vulgatum*, L. Th.
Infrequent.
- Larger Mouse-ear C. 156. *viscosum*, L. Th.
Common.
- Nodding M. C. 157. *nutans*, Raf. Th.
Macomb Co.; Flint; Lyons(!), etc. Found on low grounds from Louisiana to Hudson's Bay.
Rare.
- Field Chickweed. 158. *arvense*, L. Th.
S. Mich.—Winch. Cat.; L. Sup.—Can. Cat. Infrequent.

SAGINA

- Pearl-wort. 159. *nodosa*, E. Meyer. U. P.
"L. Sup. and northward."—Gray; Isle Royale.—Whitney's Cat.

SPERGULA

- Corn Spurry. 160. *arvensis*, L. C. & S.
Dr. Wright, Dr. Clark. Some other *Caryophyllaceae* plants occur, as *Dianthus* sp., *Silene*, *Armeria*, etc., but are not well established.
Adv. and rare.

PARONYCHIEÆ.

(Whitlow-worts.)

ANYCHIA

- Forked Chickweed. 161. *dichotoma*, Mx. S. W.
Dr. Wright. Infrequent.

SCLERANTHUS

Knawel.

162. *annuus*, L.

Lansing (!); naturalized on the Agrl. College grounds.

PORTULACACEÆ.

(Purslane Family.)

PORTULACA

Purslane.
Pustley.163. *oleracea*, L. (***)

Very tenacious of life—a vile weed in gardens.

Very com.

CLAYTONIA

Spring Beauty.
Claytonia.164. *Virginica*, L.

An early and very pretty spring flower.

Th.

Common.

MALVACEÆ.

(Mallow Family.)

MALVA

Common
Mallow.165. *rotundifolia*, L. (***)

L. P.

Common.

High M.

166. *sylvestris*, L. (***)

L. P.

Occasional.

Curled M.

167. *crispa*, Gr.

Dr. Clark.

Infrequent.

Musk M.

168. *moschata*, L.

L. P.

Not rare.

Mallow.

169. *Alcea*, L.

Lansing (!); adventive on College grounds.

SIDA

Sida.

170. *Napæa*, Cav.

Kalamazoo, R. R. track.

S.

Rare.

ABUTILON

Indian Mal-
low Velvet-
leaf.171. *Avicennæ*, Gært.

C. & S.

Roadsides and river banks. Very common in places, and, along with *Datura stramonium*, forming regular thickets. Sometimes cultivated, but rather to be cast out as a bad weed.

HIBISCUS

Swamp Rose—
Mallow.172. *Moscheutos*, L.

C. & S.

Flint; and Put-in Bay, Lake Erie. (!) This plant, long neglected, is worthy of cultivation. It is four feet high, with velvety leaves and beautiful light rose-colored flowers, six inches in diameter.

Rare.

Bladder Ket
mia.173. *Trionum*, L.

C. & S.

S.—Dr. Wright; Ann Arbor—Winch. Cat.; and Flint.

Rare.

TILIACEÆ.

(Linden Family.)

TILIA

Basswood
Linden.174. *Americana*, L.

Th.

Abundant in C. & S., common in Emmet Co. (!), and frequent in U. P., "especially in Ontonagon Valley."—Whitney Cat. A valuable timber tree, often planted for ornament, and much sought in flowering time by bees for its copious nectar, which makes the finest honey. Basswood lumber is much used in cabinet work for boxes, shelves, etc., whenever a wood is desired which is soft and easily worked, and, at the same time, tough and not liable to split.

LINACEÆ.

(Flax Family.)

LINUM

- | | | |
|--------------|--|-------------|
| Wild Flax. | 175. Virginianum, L. | S. |
| | Ann Arbor—Dr. Lyons; S. Mich.—Wright Cat. | Infrequent. |
| Wild Flax. | 176. sulcatum, Riddell. | S. |
| | Dr. Wright. | Rare. |
| Common Flax. | 177. usitatissimum, L. (*) | C. & S. |
| | Dr. Clark, and Dr. Wright. Escaped from cultivation. | Infrequent. |

GERANIACEÆ.

(Geranium Family.)

GERANIUM

- | | | |
|--------------------|--|------------|
| Wild Cranesbill. | 178. maculatum, L. (*) | C. & S. |
| | "Canada to Florida."—Torr. & Gr., Fl. N. Am. | Common. |
| Carolina C. | 179. Carolinianum, L. | Th. |
| | Macomb Co.; Clinton Co., etc. Rare in S. & C., abundant in vicinity of Farwell, Clare Co. (!), thence N. to L. Superior. | |
| Small-flow-ered C. | 180. pusillum, L. | |
| | Flint—Dr. Clark. | Adventive. |
| Herb Robert. | 181. Robertianum, L. (***) | Th. |
| | Put-in Bay, Lake Erie (!); Montcalm Co. (!); Saginaw Bay; Mackinac, and Drummond's Is.—Winch. Cat.; L. Sup.—Whitney's Cat. Common around the Gr. Lakes, but seldom seen in the interior. | |

ERODIUM

- | | | |
|--------------|--|---------|
| Storks-bill. | 182. cicutarium, L'Her. (***) | C. & S. |
| | Oceana Co. (!); Ionia Co. (!); Kalamazoo, etc. Spreads rapidly—a bad weed in gardens and fields. Not yet common. | |

FLÆRKEA

- | | | |
|----------------|---|--|
| False Mermaid. | 183. proserpinacoides, Willd. | |
| | Ionia (!); Hubbardston (!); Flint, etc. Not rare but usually overlooked. A delicate, little herb in damp woods. | |

IMPATIENS

- | | | |
|--------------------|--|-----|
| Pale Touch-me-not. | 184. pallida, Nutt. (***) | Th. |
| | Macomb Co.; Ionia Co. (!); Sugar Is.—Winch. Cat., etc. Much rarer than the next. | |

- | | | |
|--------------------------------|-------------------------|-----|
| Spotted T. Balsam. Jewel-weed. | 185. fulva, Nutt. (***) | Th. |
|--------------------------------|-------------------------|-----|

OXALIS

- | | | |
|---------------------------|---|---------|
| Common; Wood-sorrel. | 186. Acetosella, L. (***) | Th. |
| | Macomb Co.; and "L. Sup. and northward"—Gray. Rare in S. Peninsula. | |
| Violet W. | 187. violacea, L. (***) | S. E. |
| | Winchell Cat. | Rare. |
| Yellow W. Ladies' Sorrel. | 188. corniculata, L., var. stricta, Sav. (***) | Th. |
| | Marquette Co.—Burt's MS., etc., etc. | Common. |

RUTACEÆ.

(Rue Family.)

ZANTHOXYLUM

- | | | |
|------------------------------|--|-------|
| Prickly Ash. Toothache Tree. | 189. Americanum, Mill. (***) | L. P. |
| | Everywhere along streams and on low ground. The bark enters into various "bitters," and is gathered in considerable quantities for export. | |

PTELEA

- Hop-tree. 190. *trifoliata*, L. (***) C. & S.
 Shrubby Tre-
 foil.
 Wafer Ash. An interesting shrub; sometimes cultivated. Very abundant on the low, rocky islands in the western end of Lake Erie (!), and frequent along river banks and the shore of the Gr. Lakes. Occurs in the interior as far north as Montcalm Co. (!). Does not occur at Flint and is not mentioned in Dr. Cooley's MS. Cat., but is given by Dr. Wright.

ANACARDIACEÆ.

(Cashew Family.)

RHUS

- Staghorn Sumach. 191. *typhina*, L. (***) Th.
 Seldom very large; less common than the next. Worth cultivating, and the next likewise.
 Smooth S. 192. *glabra*, L. (**) Th.
 Very common in C., and nearly, or quite, as large as *R. typhina*. The trunk occasionally 5-6 in. in diameter. These two species are much alike, and, pubescence aside, one might easily be mistaken for the other. It is no stretch of imagination to believe such closely allied species, and there are many such, are descended from a common stock. Indeed, one can scarcely believe otherwise if he studies plants extensively.
 Dwarf S. 193. *copallina*, L. (**) C. & S.
 Abundant in the pine country on light soil.
 Poison S. 194. *venenata*, DC. (***)
 Poison Dog-wood. Common in swamps and poisonous to the touch. A low shrub, with smooth, grayish bark, and dull, white fruit in clusters.
 Poison Ivy. 195. *Toxicodendron*, L. (**) Th.
 Poison Oak. This is the dreaded "Poison Ivy." It is innocuous to some persons, and cows eat it with impunity. Frequent.
 Climbing P. Ivy. 196. *Toxicodendron*, L., var. *radican*, Torr. Th.
 Tall-climbing, often to tops of forest trees; stems frequently several inches in diameter. More abundant than the sp.
 Fragrant Sumach. 197. *aromatica*, Aiton. (***) Th.
 A low shrub, with bright red fruit; worthy of cultivation. Less frequent than other members of the genus. Found chiefly on bluffs and sandy hills through the middle counties of the L. P. "N. to Saskatchewan."—Torr. & Gr., Fl. N. Am.

VITACEÆ.

(Vine Family.)

VITIS

- Northern Fox-grape. 198. *Labrusca*, L. C. & S.
 Dr. Clark and Dr. Cooley. Concord, Isabella, Catawba, etc., are seedlings of this species. Rare.
 Summer Grape. 199. *æstivalis*, Mx. C. & S.
 Lyons (!); Stanton (!); Crystal Lk., Montcalm Co. (!); Flint; Ann Arbor.—Winch. Cat.; S. Mich.—Wright Cat., etc. Infrequent S.
 Frost Grape. 200. *riparia*, Mx. Th.
 Common along our rivers; infrequent in the pine region, where *V. æstivalis* is very abundant. Flowers very fragrant, filling the air with odor. The small, glaucous fruit is sometimes eaten. *Vitis cordifolia* apparently does not occur.

AMPELOPSIS

- Virginia Creeper. 201. *quinquefolia*, Mx. (***) Th.
 Five-leaf Ivy. A very desirable climber, often cultivated. Some specimens seem to cling to walls and buildings much better than others. Common.
 American Ivy.

RHAMNACEÆ.

(Buckthorn Family.)

RHAMNUS

- Buckthorn. 202. *alnifolia*, L'Her. Th.
Common.

CEANOTHUS

- New Jersey Tea. 203. *Americanus*, L. (***) Th.
Red-root. Sandy woods, rarely on beach and maple land. Frequent.
Ceanothus. 204. *ovatus*, Desf.
Dr. Pitcher; also, east shore L. Huron, E. Ont., and L. Sup.—Can. Cat.

CELASTRACEÆ

(Staff-tree Family.)

CELASTRUS

- Celastrus. 205. *scandens*, L. (***) C. & S.
Wax-work. An ornamental climbing shrub, the orange and scarlet-arrilled fruit remaining over winter. Easy to grow and desirable for its autumn and winter effect. The staminate and pistillate flowers are on different individuals, and this must not be overlooked when specimens are taken from the field for cultivation.
Climbing Bittersweet.

EUONYMUS

- Wahoo. 206. *atropurpureus*, Jacq. C. & S.
Burning-Bush. Low river-banks. Well distributed, but nowhere very common. Worthy of cultivation. Bark of shrub and roots gathered for the drug trade—an ingredient of various tonic bitters and patent nostrums.
Trailing Strawberry Bush. 207. *Americanus*, L., var. *obovatus*, T. & Gr. C. & S.
Common.

SAPINDACEÆ.

(Soapberry Family.)

STAPHYLEA

- Bladder-Nut. 208. *trifolia*, L. Th.
Marquette Co.—Burt; and frequent along river banks in L. P. A curious and interesting low shrub, with drooping white flowers, ovate, pointed, serrate leaflets, and large triangular pods, whence the common name. Sometimes cultivated and deserving attention.

ÆSCULUS

- Ohio Buckeye. 209. *glabra*, Willd. S.
Fetid B. River-bottoms, Lenawee Co.—Prof. Beal; and probably in other localities in the southern tier of counties.

ACER

- Striped Maple. 210. *Pennsylvanicum*, L. (***) N. & U. P.
Abundant in U. P.—Whitney, common at Petoskey (!), and occasional as far S. on the Huron shore as Alcona Co.—Winchell Cat., and in the interior as Houghton Lake(!).
Mountain Maple. 211. *spicatum*, Lam. C. N. & U. P.
Common in U. P.; Alcona Co.—Winch. Cat.; Crystal Lake, Montcalm Co.(!); and occasional in cold swamps as far south as banks of Grand river near Lansing—Beal.
Sugar Maple. 212. *saccharinum*, Wang. (***) Th.
Rock M. This and the next yield "maple sugar." Frequent in the U. P., and abundant in the lower, forming extensive groves, either alone or in connection with beech. Largely used for fuel, and to some extent for cabinet purposes, especially the curled and bird's eye varieties. Extensively planted as a shade-tree. In localities badly infested with borers of the genus *Clytus*.

- Black Sugar M. 213. *saccharinum*, Wang., var. *nigrum*, T. & Gr. Th.
 Along with the preceding, and much resembling it. Distinguished best by its prominent stipules and downy leaves. Common.
- Silver Maple. 214. *dasycarpum*, Ehrh. C. & S.
 White M. Low ground along rivers. This and the next are fine shade and ornamental trees. Often planted. Common.
- Red Maple. 215. *rubrum*, L. Th.
 Swamp M. On low ground and along streams. Very common.

NEGUNDO

- Negundo. 216. *aceroides*, Mœnch. C. & S.
 Box-elder. River banks. A small, handsome tree, with green twigs, ash-like leaves, Ash-leaved Maple. and pendant flowers and keys. Sometimes planted, and would be more often if its value was known. Frequent.

POLYGALACEÆ.

(*Milkwort Family.*)

POLYGALA

- Purple Polygala. 217. *sanguinea*, L. (***) C. & S.
 Belding(!); Ionia(!); Flint; Macomb Co., etc. Local, but usually abundant when found at all.
- Polygala. 218. *cruciata*, L. S.
 S. Mich.—Wright Cat. Rare.
- Polygala. 219. *verticillata*, L. C. & S.
 Flint; Lansing(!); Macomb Co.; Wayne Co.(!), etc. Common in some places, rare in others. The fresh roots have the smell of wintergreen, or *Spirea lobata*.
- Seneca Snake-root. 220. *Senega*, L. (*) Th.
 Common.
- Broad-leaved S. S. 221. *Senega*, L., var. *latifolia*, T. & Gr.
 Hubbardston (!); Flint, etc. Rare.
- Pink Polygala. 222. *polygama*, Walt. (***) C. & S.
 Sandy soil. Ionia (!), Clinton (!), Montcalm (!), and counties southward. Infrequent.
- Flowering Wintergreen. 223. *paucifolia*, Willd. (***)
 Fringed Polygala. Common on pine land; the large, rose-purple flowers very beautiful. *Comptonia*, *Rhus aromatica*, *Moneses*, and this are often found together. Dr. Wright found a variety with white flowers.

LEGUMINOSÆ.

(*Pulse Family.*)

LUPINUS

- Wild Lupine. 224. *perennis*, L. C. & S.
 Abundant in light sand. Flowers, a fine blue-purple, in May and June forming great masses of color. Worth cultivating.

TRIFOLIUM.

- Red Clover. 225. *pratense*, L. (***) Th.
 Meadows and fields. Very extensively cultivated for hay and pasture, and as a fertilizer of the soil, in which capacity it has no equal.
- White Clover. 226. *repens*, L. Th.
 Meadows, pastures, and road-sides. Very com.
- Yellow Clover. 227. *procumbens*, L. C. & S.
 Low Hop-C. Ionia (!); Lansing (!), etc. Blossoms bright yellow and very pretty. Infr.

MELILOTUS

- Yellow Melilot. 228. *officinalis*, Willd. (***) C. & S.
 Rare.

- Sweet Clover. 229. *alba*, Lam. (***) L. P.
 White Melilot.
 More common than the preceding, but only occasional. A valuable honey plant.

MEDICAGO

- Lucerne. 230. *sativa*, L. C. & S.
 Escaped from cultivation in a few places.
 Black Medick. 231. *lupulina*, L. L. P.
 Nonesuch.
 Waste places. Mackinac; Jackson (!); Ann Arbor, etc.; forming patches.

PETALOSTEMON

- Prairie Clover. 232. *violaceus*, Mx. S. W.
 "Dry prairies, Mich."—Gray. Rare.
 Prairie Clover. 233. *candidus*, Mx. S. W.
 With the preceding.—Gray. These two and the next are "prairie plants."

AMORPHA

- Lead-plant. 234. *canescens*, Nutt. S.
 W. Mich.—Winch. Cat.; Ann Arbor.—Prof. M. W. Harrington. Rare.

TEPHROSIA

- Hoary Pea. 235. *Virginiana*, Pers. (***) C. & S.
 Goat's Rue.
 Clinton Co. (!); Montcalm Co. (!); Macomb Co.; Livingston Co.—Miss Clark, etc. On light sand. Infrequent.

ASTRAGALUS

- Cooper's Vetch. 236. *Cooperi*, Gr. C. & S.
 Dr. A. B. Lyons; Cooley MS. Rare.
 Milk V. 237. *Canadensis*, L. Th.
 Put-in Bay (!); Ann Arbor (!); Macomb Co.; Orchard Lk. (!); Montcalm Co. (!); and northward. Well distributed but Infrequent.

DESMODIUM

- Tick-Trefoil. 238. *nudiflorum*, DC. C. & S.
 Crystal Lk., Montcalm Co. (!); Flint; Lansing; Macomb Co.; S. Mich.—Wright Cat., etc. Common.
 Tick-Trefoil. 239. *acuminatum*, DC. C. & S.
 Woodlands. Very common.
 Tick-Trefoil. 240. *pauciflorum*, DC. S.
 Mont Lk.—Miss Clark in Winch. Cat. Rare.
 Round-leaved T.-T. 241. *rotundifolium*, DC. C. & S.
 Trailing T.-T.
 Hubbardston (!); Ionia (!); Flint; Lansing (!); So. Haven; Macomb Co.; Ann Arbor.—Allmend. Cat., etc. Infrequent.
 Tick-Trefoil. 242. *canescens*, DC. S.
 Ann Arbor—Allmend. Cat.; S. West—Wright Cat. Rare.
 Tick-Trefoil. 243. *cuspidatum*, Hook. C. & S.
 Hubbardston (!); Flint; Lansing; Ann Arbor; Macomb Co.; S. Mich.—Wright, etc. Usually on oak land. Frequent.
 Tick-Trefoil. 244. *viridiflorum*, Beck. C. & S.
 Hubbardston (!); Macomb Co. Not common.
 Tick-Trefoil. 245. *Dillenii*, Darlingt. C. & S.
 Oak woods. Hubbardston (!); Flint; Macomb Co.; S. Mich.—Wr. Cat.; Mont Lk.—Miss Clark, etc. Frequent.
 Tick-Trefoil. 246. *paniculatum*, DC. C. & S.
 Oak woods. Hubbardston (!); Flint; Macomb Co.; Lansing; S. Haven; S. Mich.—Wr. Cat., etc. Frequent.
 Tick-Trefoil. 247. *Canadense*, DC. C. & S.
 Hubbardston (!) and probably farther N.; Flint; Lansing; Ann Arbor—Allmend. Cat. and Winch. Cat., etc. Flowers early. Frequent.

- Tick-Trefoil. 248. sessilifolium, T. & Gr. S.
"Michigan"—Gray; S. Mich.—Winch. Cat. Rare.
- Tick-Trefoil. 249. rigidum, DC. C. & S.
Hubbardston (!); Flint; Macomb Co.; Ann Arbor, and S. W.—Winch. Cat. Infrequent.
- Tick-Trefoil. 250. ciliare, DC. S.
Dr. Wright. Rare.
- Tick-Trefoil. 251. Marylandicum, Boott. C. & S.
Dry hills, Ionia(!), and southward. Infrequent.

LESPEDeza

- Creeping Lespedeza. 252. repens, Barton. (?) S.
Winchell Cat.
- Bush Clover. 253. violacea, Pers. S.
Ann Arbor—Miss Clark; S. W.—Wright. Infrequent.
- Bush Clover. 254. reticulata, Pers. C. & S.
Dry woods and fields. Common.
- Bush Clover. 255. reticulata, Pers., var. angustifolia, Maxim. S. W.
Wright Cat. Rare.
- Bush Clover. 256. Stuvei, Nutt. S.
Winchell Cat.; Gray in Manual. Rare.
- Bush Clover. 257. hirta, Elliott. C. & S.
Common.
- Bush Clover. 258. capitata, Mx. C. & S.
Abundant in old fields; prefers light sand.
- Bush Clover. 259. angustifolia, Ell. C. & S.
In the same situations, and along with the preceding two. Frequent.

VICIA

- Common Vetch. Tare. 260. sativa, L. S.
Detroit—Dr. Lyons; Springwells, near Detroit—Henry Gillman. Infrequent.
- Blue Vetch. 261. Cracca, L. S.
S. Mich.—Wright Cat.; Ann Arbor—Prof. M. W. Harrington. Rare or local.
- Pale Vetch. Carolina V. 262. Caroliniana, Walter. C. & S.
Dry soil. Very common.
- Purple V. American V. 263. Americana, Muhl. Th.
Ann Arbor; Ionia(!); Montcalm Co.(!), etc.; N. to Lake Sup. Much rarer than the preceding, and very pretty. Spreads rapidly in C., along railroads and highways, and acts like an immigrant.

LATHYRUS

- Beach Pea. 264. maritimus, Bigel. Th.
All around the Gr. Lakes, but seldom or never seen in the interior. Com.
- Vetchling. Everlasting Pea. 265. venosus, Muhl. C. & S.
Ionia Co. (!); Clinton Co. (!); Flint; Macomb Co.; Ann Arbor, etc. Beautiful, and worthy a place in the garden, by reason of its large, purple flowers. Infr.
- Pale Vetchling. Indian Pea. 266. ochroleucus, Hooker. Th.
Hillsides and dry uplands. Infr.
- Marsh Vetchling. 267. paluster, L. Th.
Ann Arbor; Ionia(!); Bay City; Antrim Co.; Petoskey to L. Sup. This and the next are both common in C., growing in marshes along with *Aplos tuberosa*, *Campanula aparinoides*, etc.
- Marsh Vetchling. 268. paluster, L., var. myrtifolius, Gr. Th.
Com.

APIOS

- Ground-nut. 269. *tuberosa*, Mœnch. C. & S.
Wild Bean.
Dakota Potato. A curious vine, with edible tubers, and fragrant, chocolate-brown flowers. Common.

PHASEOLUS

- Wild Bean. 270. *diversifolius*, Pers. S.
S. E. along shore, and on the islands of Lake Erie (!), and shore of Lake Michigan at So. Haven—Bailey. Probably not much farther north, and not found in the interior.

AMPHICARPÆA

- Hog Pea-nut. 271. *monoica*, Elliott. Th.
Fields and woods. Variable. Common.

BAPTISIA

- False Indigo. 272. *tinctoria*, R. Br. (***) C. & S.
Wild Indigo. Woodard Lake, Ionia Co. (!); Flint; Macomb Co.; Ann Arbor—Winch. Cat.; etc. Abundant in places, but not well distributed; much commoner than the next two species.
Wild Indigo. 273. *Leucantha*, Torr. & Gr. S.
Calhoun Co.—Winch. Cat.; Ann Arbor—Allmendinger Cat.; etc. Rare.
Wild Indigo. 274. *leucophæa*, Nutt. S.
Mich.—Gray. Rare.

CERCIS

- Red-bud. 275. *Canadensis*, L. C. & S.
Judas-tree. Indigenous through the southern part of the State, and as far N. in the west as Grand river valley. Plaster creek, Grand Rapids—Garfield; Ionia—Le Valley(?); banks of Thornapple river, Eaton county; Ann Arbor; Adrian; South Haven, etc. This tree is quite frequent in the valley of the river Raisin, 10 miles S. W. of Adrian, in company with *Negundo*, *Gymnocladus*, and *Æsculus glabra*. The largest trees are ten inches in diameter—Henry Owen. Frequently cultivated.

CASSIA

- Wild Senna. 276. *Marylandica*, L. (*) C. & S.
Lyons(!); Grand Haven(!); Ann Arbor, etc. River banks; a tall weed with bright yellow blossoms. Infrequent.

GYMNOCLADUS

- Kentucky 277. *Canadensis*, Lam. C. & S.
Coffee-tree. A slender tree along river banks, as far N. as Maple river, in Clinton Co. (!); also Fisk creek, Montcalm Co. (!); banks of Grand river (!); etc. The largest specimen seen was about 60 feet high, and less than a foot in diameter. The wood is reddish, fine-grained, tough, and takes a good polish. Sometimes planted, and a valuable ornamental tree, with clubby branches, large and graceful bi-pinnate leaves, and large, flat pods in autumn. Farther south, a large tree. Infrequent.

GLEDITSCHIA

- Honey Locust. 278. *triacanthos*, L. S.
Three-thorned Acacia. Grows along the river Raisin, and is certainly indigenous. Often two feet in diameter.—Prof. Beal, Henry Owen, *et al.* Probably along the St. Joseph, also, and in other localities in the extreme S. Frequently planted for hedges.

ROSACEÆ.

(Rose Family.)

PRUNUS

- Wild Plum. 279. *Americana*, Marshall. C. & S.
Along our rivers; the fruit either round or oblong, yellow, red, or green, and pleasant or bitter. Occasionally a tree bears large fruit which is quite palatable. Frequently the plums blast and the trees bear instead hollow, green bodies somewhat resembling plums. Common.

- Dwarf Cherry. 280. *pumila*, L. Th.
 Sand Cherry. L. Sup.; Emmet Co.(!); Houghton Lake(!); Mecosta Co.(!); South Haven; Saginaw Bay—Winchell, etc. Frequent in the N. half of the L. P., but not yet found in the interior S. of Saranac, Ionia Co.(!), where it occurs in a dry glade along with *Synthyris*, *Castilleja*, *Lupinus*, and *Senecio aureus*.
- Wild Red Cherry. 281. *Pennsylvanica*, L. Th.
 Pin Cherry. Very abundant on sandy land in the N. half of the State, but less common southward, where *P. serotina* takes its place. Occasionally it becomes a good sized tree,—40-50 feet high, a foot and a half in diameter. One such stands by the road-side near Prairie Cr., in Ronald Tp., Ionia Co.
- Choke Cherry. 282. *Virginica*, L. Th.
 A shrub or small tree. Very pretty in May by reason of its light green leaves and racemes of white flowers. Sometimes cultivated for ornament. Common.
- Wild Black Cherry. 283. *serotina* Ehrh. (*) Th.
 A medium sized timber tree, well known as "Black Cherry." Frequent in C. and S., in places sufficiently so for economic use. Rare in N. and U. P. The bark is often used as a tonic.

NEILLIA

- Nine-Bark. 284. *opulifolia*, Benth. and Hook. Th.
 Along streams. A low shrub with re-curved branches, white flowers, clusters of reddish pods, and something the habit of red currant but larger. Occasionally cultivated and a good addition to the lawn.

SPIREA

- Meadow-Sweet. 285. *salicifolia*, L. Th.
 Willow. In marshes. Common.
 leaved Spirea. 286. *tomentosa*, L. (**) C. & S.
 Hardhack. Ionia Co. (!) and southward. A low shrub with fine rose-colored flowers, in dense panicles, and leaves rusty-wooly beneath. A striking plant and worth trying in the garden. Infr.
 Steeple-Bush. 287. *lobata*, Jacquin. S.
 Queen of the Prairie. "Meadows and prairies, Penn. to Mich."—Gray. Occurs, if at all, only in the S. Often cultivated.

GILLENIA

- Gillenia. 288. *trifoliata*, Moench. (**) S.
 Bowman's Root. Winchell Cat. Rare.
 Indian Physic.

POTERIUM

- Canadian Burnet. 289. *Canadense*, Benth. & Hook. S.
 South Haven—Bailey; Ann Arbor—Allmendinger. Rare.

AGRIMONIA

- Agrimony. 290. *Eupatoria*, L. (***) Th.
 Dry soil. Common.
 Small-flowered A. 291. *parviflora*, Ait. (***) S. E.
 Detroit—Miss Clark; Macomb Co. Infrequent.

GEUM

- White Geum. 292. *album*, Gmelin. Common.
 Avens. Virginia G. 293. *Virginianum*, L. C. & S.
 Common.
 Large-leaved G. 294. *macrophyllum*, Willd. U. P.
 Rare, or not at all in L. P.
 Strict G. 295. *strictum*, Aiton. Th.
 New Haven, Gratiot Co.(!); Petoskey(!), etc. Rare S.
 Purple Avens. 296. *rivale*, L. (**) Th.
 Water A. Swamps and wet places. Common.

Three-flow-
ered Geum.

297. triflorum, Pursh.

Otisco Tp., Ionia Co. (!)—A. B. Morse; Montcalm Co., near Greenville (!); the only reported localities in the State. Attractive by reason of its long, plumose styles, and dissected, fern-like leaves. Rare.

WALDSTEINIA

Barren Straw-
berry.

298. fragarioides, Tratt.

Th.

Livingston Co.—Winch. Cat.; Ionia (!); Flint, etc.; to L. Sup.—Whitney Cat. Rather local, but abundant when found at all.

POTENTILLA

Cinquefoil.

299. Norvegica, L.

Th.

Common.

Common C.
Five-Finger.

300. Canadensis, L.

Th.

Macomb Co., and Flint to L. Sup. Rare in C. & S.

Five-Finger.

301. Canadensis, L., var. simplex, T. & Gr.

Range unknown; the common form in C. & S., where it is abundant.

Arctic Poten-
tilla.

302. frigida, Villars.

U. P.

Dr. Lyons.

Rare.

Silvery
Cinque foil.

303. argentea, L.

S.

Ann Arbor—Clark and Allmendinger. Not reported by any other observers.

Stout Poten-
tilla.

304. arguta, Ph.

Th.

Flowers either white or yellow, generally all in one locality of one color; the same is true of *moth mullein*; Ann Arbor; Macomb Co.; Lansing (!); Ionia (!); and N. to Isle Royal. Frequent on light sand; in places, common.

Silver-weed.

305. Anserina, L.

Th.

Frequent along the Great Lakes, but rare in the interior.

Shrubby
Cinque-foil.

306. fruticosa, L.

Th.

Edges of swamps. A low shrub with small, silky leaves, and a profusion of showy yellow blossoms, in August. Ranges N. to Arctic America. Common.

Three-toothed
C.

307. tridentata, Solander.

N. & U. P.

Barrens of Missaukee Co. (!); "shores of the Upper Great Lakes"—Gray; Isle Royal—Dr. Lyons. Infrequent.

Marsh Five-
Finger.

308. palustris, Scop.

Swamps throughout, but nowhere abundant.

FRAGARIA

Wild Straw-
berry.

309. Virginiana, Duchesne. (***)

Th.

Very common.

Wild Straw-
berry.

310. Virginiana, Duch., var. Illinoensis, Gr.

U. P.—Henry Gillman, in Am. Nat., Sept. '69; and probably in Lower P., also.

Wild Straw-
berry.

311. vesca, L.

Th.

Occasional in S., frequent in C., and abundant northward, where it seems to take the place of *F. Virginiana*. Moist woodlands and borders of swamps.

RUBUS

Dalibarda.

312. Dalibarda, L.

S.

Ann Arbor—Mary Clark; Macomb Co.—Cooley. May occur farther north, and perhaps throughout. Rare.

Purple Flow-
ering Rasp-
berry.

313. odoratus, L.

Th.

From Ft. Gratiot (Winchell) northward. Not observed in the interior through C. & S. Common in N. & U. P.

White Flow-
ering R.

314. Nutkanus, Moçino.

N. & U. P.

Frequent at Petoskey (!) and common farther north.

Dwarf R.

315. triflorus, Richard.

Th.

Frequent.

- Wild Red R. 316. *strigosus*, Mx. Th.
Variable. Many seedlings in cult. Common.
- Black R. 317. *occidentalis*, L. Th.
Thimbleberry Our garden Black-caps are seedlings of this. Hybrids between this and the preceding frequently occur. Common.
- Blackberry. 318. *villosus*, Aiton. (*) Th.
Very common in C. covering thousands of acres of waste pine-land to the exclusion of almost everything else. Rare in U. P. The fruit is agreeable and much gathered. Occasionally a plant is found bearing large berries of superior quality. This sp. is the original of the Lawton, Wilson, Kittattiny, and other cultivated sorts.
- Dewberry. 319. *Canadensis*, L. (*) C. & S.
Low Black-berry. Extensively trailing—12 ft. or more—deep-rooted, hard to exterminate, and troublesome in sandy fields. Fruit ripe about the middle of July, sweeter than that of *R. villosus*. Frequent.
- Running 320. *hispidus*, L.
Swamp B. Very abundant through the C. in the pine country, frequently covering the ground; also, S. and probably Th.

ROSA

- Prairie Rose. 321. *setigera*, Mx. C. & S.
Climbing Rose. So. Haven—Bailey; Jackson Co.—Winchell; Flint—Dr. Clark; Macomb Co.—Cooley; Grosse Isle—Miss Clark. Possibly indigenous, but very rare or local. Cultivated.
- Swamp R. 322. *Carolina*, L. Th.
Swamps. Common.
- Dwarf Wild 323. *parviflora*, Ehrh. C. & S.
Rose. Abundant and pretty. In the C. it is our common wild-rose. Dry soil. A low form on hills about Ionia has narrow leaves, with peduncles and ripe fruit glandular-bristly.
- Early Wild 324. *blanda*, Aiton. Th.
Rose. Ionia (!); Hubbardston (!); Flint; Ft. Gratiot—Winch. Cat., etc. Common northward, but infrequent south of lat. 43°.
- Sweet Briar. 325. *rubiginosa*, L. C. & S.
Roadsides. Frequent.

CRATÆGUS

- Scarlet-fruit- 326. *coccinea*, L. Th.
ed Thorn. Common.
- Downy Thorn. 327. *subvillosa*, Schrader. C. & S.
Frequent in C.; our largest thorn, frequently 20-25 ft. and a foot in diameter.
- Black Thorn. 328. *tomentosa*, L. C. & S.
Pear T. The form doubtfully referred to this species is a shrub with large, thick, oval, sharply-serrate leaves, beneath prominently veined, and tapering into a marginal petiole; corymbs *very straggling* and *fruit quite small*— $\frac{1}{4}$ in. Infrequent.
- Pear T. 329. *tomentosa*, L., var. *pyrifolia*, Gr. Th.
Common.
- Pear T. 330. *tomentosa*, L., var. *punctata*, Gr. C. & S.
A shrub or low tree. Very common in C. Other forms of *Cratægus* occur, and the whole genus evidently needs revision.
- Cockspur 331. *Crus-galli*, Linn. C. & S.
Thorn. Usually a shrub. Used for hedges in the East. Common.

PIRUS

- American 332. *coronaria*, L. C. & S.
Crab-apple. Thickets and along streams; the fine rose-colored flowers delightfully fragrant in May. The fruit green and bitter. Common.
- Choke-berry. 333. *arbutifolia*, L. Th.
Hubbardston (!), etc. Rare in C.

- Choke-berry. 334. *arbutifolia*, L., var. *melanocarpa*, Hook. Th.
Burt. MS.; Isle Royale—Whitney's Cat., etc. Frequent in swamps
through C.
- American 335. *Americana*, DC. (***). N. & U. P.
Mountain Ash. Ludington, and north along the Michigan shore to Charlevoix; Sault Ste.
Marie; and into Canada where it is common; also westward through
U. P.—Burt, and Whitney.

AMELANCHIER

- June-berry. 336. *Canadensis*, Torr. & Gr. Th.
Shad-bush. A shrub or small tree. Fruit variable in size and flavor, frequently
Service-berry. delicious, and so well known to the birds that one can seldom find it
well ripened. Undoubtedly horticulturists could develop this into a
profitable fruit, but having already so many choice kinds, it is ques-
tionable if there would be any immediate profit. It is well, however,
to remember that all our choice fruits have come from very ordinary
wild sorts. Common.
- Service-berry. 337. *Canadensis*, Torr. & Gr. var. (?) *oblongifolia*, T. & Gr. Th.
Ionia (!); Flint; S. Mich.—Winchell Cat. A low shrub on sandy land.
Infrequent.
- Service-berry. 338. *Canadensis*, Torr. & Gr., var. *rotundifolia*, T. & Gr. C. & S.
Along streams, nearly as large as the sp.; leaves oval, serrate, promi-
nently veined beneath. Flint; Hubbardston (!), etc. Not common.
- Service-berry. 339. *alnifolia*, Nutt. L. P.
Presque Isle—Winchell; Flint—Dr. Clark. Rare.

SAXIFRAGACEÆ.

(Saxifrage Family.)

RIBES

- Wild Goose- 340. *Cynosbati*, L. Th.
berry. The large berries prickly, but edible. Common.
- Wild Goose- 341. *oxyacanthoides*, L. C. & S.
berry. Low grounds along Fish Creek, and Maple River (!); Flint; Macomb
Co., etc. Fruit smooth. Common.
- Wild Goose- 342. *rotundifolium*, Mx. Th.
berry. St. Joseph's Is., and Sitting Rabbit—Winch. Cat. Rare in C. & S.
- Swamp Goose- 343. *lacustre*, Poir. N. & U. P.
berry. As far south as Houghton Lake (!).
- Fetid Cur- 344. *prostratum*, L'Her. C. N. & U. P.
rant. Flint; Isabella Co. (!); Missaukee Co. (!); St. Joseph's Is.—Winch. Cat.,
etc.
- Wild Black 345. *floridum*, L. Th.
Currant. Common.
- Red Currant. 346. *rubrum*, L. Th.
Deep swamps and cold woods, under tamaracks. Ann Arbor; Ionia (!);
Stanton (!), and northward. Infrequent.

PARNASSIA

- Grass of Par- 347. *parviflora*, DC. U. P.
nassus. L. Sup.—Can. Cat.; Grand Island—Henry Gillman; also, northwest shore
of Lake Michigan, in Wisconsin—Gillman.
- Grass of Par- 348. *palustris*, L. U. P.
nassus. Drummond's Is.—Winch Cat.; "Shore of L. Sup., and northward"—Gray,
from Dr. Pitcher.
- Grass of Par- 349. *Caroliniana*, Mx.
nassus. Swamps and wet banks. Rare northward; common in C. & S.

SAXIFRAGA

- Yellow Moun- 350. *aizoides*, L. U. P.
tain Sax-
ifrage. "Northern Michigan."—Gray.

Three-tooth'd Saxifrage.	351. <i>tricuspidata</i> , Retz.	U. P.
	"Shore of L. Sup. and northward"—Gray; Isle Royale—Dr. Lyons and Whitney Cat.	
Saxifrage.	352. <i>Aizoon</i> , Jacq.	U. P.
	"Upper Mich."—Gray; Isle Royale—Lyons, and Whitney.	
Early S.	353. <i>Virginicensis</i> , Mx.	U. P.
	L. Sup.—Can. Cat., etc.	
Swamp S.	354. <i>Pennsylvanica</i> , L.	Th.
	Bogs.	Common.

HEUCHERA

Alum-root.	355. <i>Americana</i> , L. (**)	C. & S.
	Grand Rapids—Coleman; Ann Arbor—Winch. Cat.	Rare.
Alum-root.	356. <i>hispida</i> , Ph.	C. & S.
	Common in Grand-Saginaw Valley.	

MITELLA

Two-leaved Mitrewort.	357. <i>diphylla</i> , L.	Th.
Bishop's Cap.	Hillsides in rich woods. Seeds black.	Very common.
Naked M.	358. <i>nuda</i> , L.	Th.
	Shaded swamps in <i>Sphagnum</i> . Racemes sometimes inclined to be paniculate; seeds brown. A very delicate and pretty little herb, usually growing under tamaracks and along with <i>Ribes rubrum</i> , <i>Chiogenes hispidula</i> , <i>Smitacina trifolia</i> , and <i>Salix candida</i> . The scape frequently bears a small leaf, as if to suggest the derivation of this and the preceding from one earlier form.	Frequent.

TIARELLA

False Mitrewort.	359. <i>cordifolia</i> , L.	Th.
	Ft. Gratiot; Macomb Co.; Flint; Stanton (!); and northward. Common in N. & U. P.; rare in C. & S. W.	

CHRYSOSPLENIUM

Golden Saxifrage.	360. <i>Americanum</i> , Schw.	
	So. Haven; Hubbardston (!); Flint; and north.	Infr.

CRASSULACEÆ.

(*Orpine Family.*)

PENTHORUM

Ditch Stone-crop.	361. <i>sedoides</i> , L. (***)	C. & S.
	Roadsides and ditches, everywhere.	

SEDUM

Live-for-ever. Garden Orpine.	362. <i>Telephium</i> , L. (***)	C. & S.
	Escaped from cultivation, as have <i>S. acre</i> and some others.	

HAMAMELACEÆ.

(*Witch-Hazel Family.*)

HAMAMELIS

Witch-Hazel.	363. <i>Virginiana</i> , L. (***)	Th.
	The yellow blossoms open in November after the leaves have fallen. The ripe pods burst with a sharp report, scattering the seeds,—this is frequently the case with pods of other plants.	Common.

HALORAGEÆ.

(*Water-Milfoil Family.*)

MYRIOPHYLLUM

- Water-Milfoil. 364. *spicatum*, L. Th.
 L. Sup.—Can. Cat.; etc.
- Water-Milfoil. 365. *verticillatum*, L. Th.
 Hubbardston (!); Flint; Macomb Co.; S. Mich.—Wright Cat.
- Water-Milfoil. 366. *heterophyllum*, Mx. C. & S.
 Fruitport—E. J. Hill; Huron R. at Ypsilanti—Lyons; Macomb Co.—Cooley.
- Water-Milfoil. 367. *tenellum*, Bigel. (?)

PROSERPINACA

- Mermaid-weed. 368. *palustris*, L.
 In swamps along with *Alopecurus aristulatus*, and *Ludwigia palustris*.
 Freq.

HIPPURIS.

- Mare's-Tail. 369. *vulgaris*, L. Th.
 L. Sup.—Can. Cat.; S. Mich.—Wright Cat. Rare.

ONAGRACEÆ.

(*Evening-Primrose Family.*)

CIRCÆA

- Enchanter's Night-shade. 370. *Lutetiana*, L. Th.
 Woods. Very common.
- Enchanter's Nightshade. 371. *alpina*, L. Th.
 Woods. Common.

GAURA

- Gaura. 372. *biennis*, L. S.
 Dr. Wright.

EPILOBIUM

- Great Willow-herb. 373. *spicatum*, Lam. (***) Th.
 Fire-weed. Springs up abundantly where forests have been burned over, hence one common name.
374. *origanifolium*, Lam. U. P.
 "Upper Wisconsin and Michigan"—Gray.
- Linear leaved Epilobium. 375. *palustre*, L., var. *lineare*, Gr.
 Hubbardston (!); Flint; Stanton (!); and north to L. Sup. Infrequent in C. and rare or not at all in S.
- Downy Willow-herb. 376. *molle*, Torr. C. & S.
 Hubbardston (!); Flint; Lansing (!); Ann Arbor; Macomb Co., etc. Probably Th. Frequent.
377. *coloratum*, Muhl. Th.
 Common.

GENOTHERA

- Evening Primrose. 378. *biennis*, L. (***) Th.
 Common.
- Evening Primrose. 379. *biennis*, L., var. *muricata*, Lindl. Th.
 L. Sup.—Can. Cat.; Petoskey (!); Ionia (!), etc.
- Evening Primrose. 380. *biennis*, L. var. *grandiflora*, Lindl.
 L. Sup.—Can. Cat.

- Sundrops. 381. *fruticosa*, L. C. & S.
Palo, Ionia Co. (!); Flint; Macomb Co.; Ann Arbor—Allmend. Cat.
Infrequent.
- Small Eno- 382. *pumila*, L. (includes *Æ. chrysantha*, Mx.) Th.
thera. Ontonagon Falls—Whitney Cat.; So. Mich.—Wr. Cat. Infrequent.
- LUDWIGIA
- False Loose- 383. *alternifolia*, L. S. W.
strife. Dr. Wright.
Seed-box.
- False L. 384. *sphærocarpa*, Ell. (?)
Near Detroit—Dr. Cooley.
- False L. 385. *polycarpa*, Short & Peter. C. & S.
Dr. Pitcher and Dr. Clark. Rare.
- Water Purs- 386. *palustris*, Ell. L. P.
lane. Common.

LYTHRACEÆ.

(Loosestrife Family.)

- AMMANNIA
- Ammannia. 387. *humilis*, Mx. S.
"Michigan, Ill., and southward"—Gray. Rare.

LYTHRUM.

- Loosestrife 388. *alatum*, Ph. S.
Near Detroit—Cooley MS.; S. Mich.—Wright Cat.; Kalamazoo—Tuthill.

NESÆA

- Swamp L. 389. *verticillata*, HBK. C. & S.
Crystal Lake, Montcalm Co. (!); Flint; Birmingham, Oakland Co. (!); So.
Haven, etc. Infrequent.

CACTACEÆ.

(Cactus Family.)

OPUNTIA

- Prickly Pear. 390. *Rafinesquii*, Engelm.
Indian Fig. Common in Newaygo Co. along the Muskegon R. (!) ("a quite spiny
form" Engelmänn), and a stunted variety on sand barrens near Green-
ville (!)—Mr. Satterlee; also, northward into British Am.—Engelmänn.
O. vulgaris does not occur.

CUCURBITACEÆ.

(Gourd Family.)

SICYOS

- One-seeded 391. *angulatus*, L. S.
Star Cucum- Put in Bay, Lk. Erie (!), and undoubtedly within our limits. Rare.
ber.

ECHINOCYSTIS

- Wild Balsam 392. *lobata*, Torr. & Gr. C. & S.
apple. Common in low woods along streams. Ionia (!); Lansing (!); So. Haven;
Macomb County; Ann Arbor—Allmend. Cat., etc. Cultivated in the
east for arbors, window-screens, etc., but rarely here.

FICOIDEÆ.

(Fig Family.)

MOLLUGO

- | | | |
|--------------|-----------------------------|---------|
| Carpet-weed. | 393. verticillata, L. | C. & S. |
| | Roadsides and sandy fields. | Common. |

UMBELLIFERÆ.

(Parsley Family.)

HYDROCOTYLE

- | | | |
|-------------------|--------------------|-------|
| Water Penny-wort. | 394. Americana, L. | L. P. |
| | Common in C. | |

- | | | |
|-------------------|---|--|
| Water Penny-wort. | 395. umbellata, L. | |
| | Pine Lake, Lansing (!); Woodard Lake, Ionia Co. (!); S. Mich.—Wright Cat., etc. Much rarer than the preceding. Either grows on sandy shores or is wholly aquatic, with floating leaves. | |

SANICULA

- | | | |
|-------------------|---|------------------------------------|
| Black Snake-root. | 396. Canadensis, L. (***) | C. & S. |
| Sanicle. | Hubbardston (!); Flint; Ann Arbor—All. Cat., etc. | Beech and maple woods. Infrequent. |
| | 397. Marylandica, L. (***) | Th. |
| | Oak woods. | Common. |

ERYNGIUM

- | | | |
|---------------------|----------------------------|-------|
| Rattlesnake Master. | 398. yuccæfolium, Mx. (**) | S. W. |
| Button Snake-root. | Dr. Wright. | Rare. |
| Eringo. | | |

POLYTAENIA

- | | | |
|-------------|------------------------|-------|
| Polytaenia. | 399. Nuttallii, DC. | S. |
| | Dr. Wright, also Gray. | Rare. |

HERACLEUM

- | | | |
|--------------|------------------------------|---------|
| Cow-parsnip. | 400. lanatum, Mx. (***) | Th. |
| | Low ground; tall and coarse. | Common. |

PASTINACA

- | | | |
|----------|-----------------|-------------|
| Parsnip. | 401. sativa, L. | |
| | Fields, etc. | Infrequent. |

ARCHEMORA

- | | | |
|----------|---|--------------------------------|
| Cowbane. | 402. rigida, DC. | C. & S. |
| | Hubbardston (!); Ann Arbor.—All. Cat., etc. | Not much N. of lat. 43°. Infr. |
| | 403. rigida, DC., var. ambigua, T. & Gr. | S. |
| | Dr. Wright. | |

ARCHANGELICA

- | | | |
|---------------------|--|---------------------------------|
| Hairy Archangelica. | 404. hirsuta, Torr. & Gr. (***) | L. P. |
| | Emmet Co.—Winch. Cat.; Lansing (!); Pontiac (!); Detroit, etc. | Dry banks and open woods. Infr. |
| Great Angelica. | 405. atropurpurea, Hoffman. (***) | Th. |
| | Occasional in S., common in C. & N.; also, L. Sup.—Can. Cat. | |

SELINUM

- | | | |
|------------------|---|-------|
| Hemlock-Parsley. | 406. Canadense, Mx. (***) | Th. |
| | Ann Arbor—All. Cat.; Macomb Co.; Flint; Hubbardston (!); and north. | Infr. |

THASPIUM

- Meadow-Pars-nip. 407. *aureum*, Nutt. Th.
 Macomb Co.; Ann Arbor—Miss Allmendinger; Sag. Bay, and Drummond's Is.—Winch. Cat. Not observed in Grand R. Valley, nor S. W. Freq.
- Meadow-Pars-nip. 408. *aureum*, Nutt., var. *apterum*, Gr. C. & S.
 Low ground; very common in C.
- Meadow-Pars-nip. 409. *trifoliatum*, Gr. C. & S.
 Flint; Put-in Bay (!); and S. W.—Dr. Wright. Rare.

PIMPENELLA

- Alexanders. 410. *integerrima*, Benth. & Hook. Th.
 Dry soil. Very abundant in Grand-Saginaw Valley. Common.

CICUTA

- Spotted-Hem-lock. 411. *maculata*, L. (***) Th.
 Beaver-Poison. Low meadows and swamps. Roots tuberous like the dahlia, and very Com.
 Musquash-root. poisonous.
- Bulbous Cicuta. 412. *bulbifera*, L. Th.
 Swamps. Common.

SIUM

- Water-Pars-nip. 413. *cicutæfolium*, Gmelin. (***) Th.
 Clinton Co. (!); S. Mich.—Winch. Cat., etc. Frequent.

BERULA

- Water-Pars-nip. 414. *angustifolia*, Koch. (***) S.
 Winchell, and Dr. Gray. Infrequent.

CRYPTOTÆNIA

- Honewort. 415. *Canadensis*, DC. C. & S.
 Low woods. Common.

CHÆROPHYLLUM

- Chervil. 416. *procumbens*, Urantz. C. & S.
 Low woods. Frequent in Grand River Valley (!); also Macomb Co.

OSMORRHIZA

- Sweet Cicely. 417. *longistylis*, DC. Th.
 Cultivated in gardens for its aromatic root. Common.
- Hairy S. C. 418. *brevistylis*, DC. Th.
 "The prevailing species."—Winchell. Probably true of counties along the Huron shore. Common.

CONIUM

- Poison Hem-lock. 419. *maculatum*, L. (*) Th.
 Infrequent in C. & S. Common at Mackinac—Winch. Cat.

ERIGENIA

- Harbinger-of-Spring. 420. *bulbosa*, Nutt. C. & S.
 Pepper-and-Salt. A delicate little plant in low woods, the flowers peeping from under matted leaves in earliest spring, often before the snow is gone. Common.

ARALIACEÆ.

(Ginseng Family.)

ARALIA

- Spikenard. 421. *racemosa*, L. (***) Th.
 Spicy-aromatic; sometimes cultivated. Frequent.
- Bristly Sarsaparilla. 422. *hispida*, Ventenat. (***) C. N. & U. P.
 Wild Elder. Apparently not south of the pine region. Common.

- Wild Sarsaparilla. 423. nudicaulis, L. (**) Th.
Very common.
- Ginseng. 424. quinquefolia, Decsne. and Planch. (**) Th.
Sault Ste. Marie; Ludington (!); Stanton (!), in great abundance; Hubbardston (!); Flint; Macomb Co.; Southwest—Wright Cat., etc. Usually rare, but so common in places that it has been dug for profit, and nearly exterminated. Root aromatic, medicinal.
- Ground-nut. Dwarf Ginseng. 425. trifolia, Decsne. & Planch. C. & S.
Very common in C.

CORNACEÆ.

(Dogwood Family.)

CORNUS

- Dwarf Cornel. Bunch-berry. 426. Canadensis, L. C. N. & U. P.
Rare, or not at all in S. Very Common.
- Flowering Dogwood. 427. florida, L. (*) C. & S.
Frequent as far north as Grand-Saginaw Valley, usually as a low tree in oak woods. Montcalm Co. is its northern limit (?). Not given in Wisconsin State Cat. Worthy of cultivation for its showy white blossoms, red fruit, and autumn foliage. Frequently blooms when only a bush, 3-4 ft.
- Round-leaved Dogwood. 428. circinata, L' Her. (**) Th.
Frequent.
- Silky Cornel. Kinnikinnick. Swamp Dogwood. 429. sericea, L. (**) C. & S.
Perhaps further north. Indians use the inner bark for smoking.
- Red-osier Dogwood. 430. stolonifera, Mx. Th.
Marshes, borders of streams, etc.; abundant on sand dunes of Emmet Co. (!) Very Common.
- Panicled Cornel. 431. paniculata, L' Her. L. P.
The white flower eagerly devoured by partridges. Common.
- Alternate-leaved C. 432. alternifolia, L. L. P.
Banks. The dead stems bright yellow. Frequent.

NYSSA

- Pepperidge. Tupelo. Black or Sour Gum. 433. multiflora, Wang. C. & S.
Edges of swamps as far north as Gratiot Co. (!). A small or medium-sized tree. Largest specimens seen, 2 to 3 ft. in diameter. Frequent.

CAPRIFOLIACEÆ.

(Honeysuckle Family.)

LINNÆA

- Twin-flower. 434. borealis, Gronovius. C. N. & U. P.
Very abundant in N. & U. P.; south to Grand river valley, and S. E. to Macomb Co. Probably in S. W.

SYMPHORICARPUS

- Wolf-berry. 435. occidentalis, R. Br. C. N. & U. P.
Ft. Gratiot—Austin; N. Mich.—Gray. Rare.
- Snowberry. 436. racemosus, Mx. C. N. & U. P.
Along the Great Lakes. Saginaw bay, and Alpena Co.—Winchell; L. Sup.—Can. Cat. Not observed in interior of L. P. Common in cultivation.
- Snowberry. 437. racemosus, Mx., var. pauciflorus, Robbins. U. P.
Dr. Robbins.
- Indian Currant. Coral-berry. 438. vulgaris, Mx. (?) S.

I. ONICERA

- Small Honey-suckle. 439. *parviflora*, Lam.
L. Sup.—Whitney's Cat.; Petoskey(!), where it appears distinct from the next; Ann Arbor—Miss Allmendinger; Macomb Co.
- Small Honey-suckle. 440. *parviflora*, Lam., var. *Douglasii*, Gr.
Ionia(!); Montcalm Co.(!); Ann Arbor—All. Cat., etc. This and the former apparently run together in C., forms occurring that do not answer well to Gray's description of either species. Flowers bright yellow to crimson purple; corolla downy or nearly smooth; leaves glaucous. Swamps or dry soil. Common.
- Hairy H. 441. *hirsuta*, Eaton. Th.
Frequent northward; rare in C. & S., Flint, and Macomb Co.
- American Woodbine. 442. *grata*, Aiton.
Dr. Lyons.
443. *involuta*, Banks. U. P.
Mainland and Isle Royale.
- Fly-Honey-suckle. 444. *ciliata*, Muhl. Th.
Common in C.
- Mountain F. 445. *cœrulea*, L. U. P.
Dr. Lyons.
- Swamp F. 446. *oblongifolia*. Th.
Macomb Co.; Stanton(!); Edmore(!); Isabella Co. (!), etc. More frequent in N. & U. P. Rare in S.

DIERVILLA

- Bush Honey-suckle. 447. *trifida*, Moench. (***) Th.
Rocky woods and bluffs. Very common.

TRIOSTEUM

- Horse-Gentian. 448. *perfoliatum*, L. (**) C. & S.
Fever-wort. Clinton Co.(!); Ionia Co.(!); Flint; Macomb Co., etc. Frequent.

SAMBUCUS

- Common Elder. 449. *Canadensis*, L. (*)
Sweet Elder. Follows settlements. Com.
- Red-berried Elder. 450. *pubens*, Mx. Th.
More northern in its range than the last. Variety with dissected leaves seen in Clare county.

VIBURNUM

- Sweet Viburnum. 451. *Lentago*, L.
Frequent in C. and S., and probably Th.
- Black Haw. 452. *prunifolium*, L. S.
Dr. Lyons.
- Withe-rod. 453. *nudum*, L. Th.
Macomb Co.; Hubbardston(!); Stanton(!); Riverdale, Gratiot Co.(!); Houghton Lk. (!); to L. Superior. Frequent.
- Arrow-wood. 454. *dentatum*, L.
Lansing—Bailey; Macomb Co.—Cooley. Infr.
- Downy A. 455. *pubescens*, Ph. Th.
Common.
- Maple-leaved A. 456. *acerifolium*, L. L. P.
Dockmackie. Freq.
- Few-flowered A. 457. *pauciflorum*, Pylaie. U. P.
Dr. Lyons.
- Cranberry tree. 458. *Opulus*, L. (***) Th.
Bush Cranberry. Swamps and borders of streams. Com.

- Hobble-bush. 459. *lantanoides*, Mx. U. P.
American Way-
faring tree. Whitney's Cat. Mr. Whitney found none of the sp. abundant in the U. P.

RUBIACEÆ.

(Madder Family)

GALIUM

- Cleavers. 460. *Aparine*, L. (***) Th.
Goose Grass. 461. *asprellum*, Mx. Th.
Rough Bed- Freq.
straw. 462. *concinnum*, Torr. & Gray. C. & S.
Flint; and Ann Arbor.—All. Cat. Rare.
Small B. 463. *trifidum*, L. var. *pusillum*, Gr. Th.
Sphagnous swamps. Common in C.
Small B. 464. *trifidum*, L. var. *tinctorum*, Gr. (***) Th.
Shore of Sag. Bay.—Winch. Cat., etc.
Small B. 465. *trifidum*, L. var. *latifolium*, Gr. C. & S.
Infrequent.
Sweet-scented 466. *triflorum*, Mx. Th.
B. Freq. in C. & S., and very abundant northward.
Hairy B. 467. *pilosum*, Aiton. C. & S.
Frequent as far north as Grand-Saginaw Valley.
Wild Liquor- 468. *circæzans*, Mx. C. & S.
ice. Common.
Wild Liquor- 469. *lanceolatum*, Torrey. Th.
ice. Riverdale, Gratiot Co. (!); Hubbardston (!); Flint; Macomb Co.; and S.
Mich.—Wr. Cat.; also, L. Sup.—Whitney. Infr.
Northern Bed- 470. *boreale*, L. Very common.
straw. *Galium verum* has run wild in a few places.

CEPHALANTHUS

- Button-bush. 471. *occidentalis*, L. (***) L. P.
Swamps and flooded river-bottoms. Very common.

MITCHELLA

- Partridge- 472. *repens*, L. (***) Th.
berry. Prefers beech and maple, hemlock, or pine woods, and is seldom found
under oaks. Common.

HOUSTONIA

- Houstonia. 473. *purpurea*, L. (?)
Ann Arbor—Winch. Cat.
Houstonia. 474. *purpurea*, L. var. *longifolia*, Gr. Th.
Ionia (!), common; Clare Co. (!), abundant, etc.; to L. Sup.—Can. Cat.
Houstonia. 475. *purpurea*, L. var. *ciliolata*, Gr. S.
Dr. Wright.
Blucts. 476. *cœrulea*, L. (?)

VALERIANACEÆ.

(Valerian Family.)

VALERIANA

- Valerian. 477. *sylvatica*, Mx.
Sphagnous swamps, local. Frequently cultivated. C. & S., and probably
Th.

- Valerian. 478. *edulis*, Nutt. S. E.
Ann Arbor and Macomb county. Rare.

FEDIA

- Corn-Salad. 479. *Fagopyrum*, Torr. & Gr. C. & S.
Lamb-Lettuce. Flint; Ionia(!); Lyons(!), etc. Not common.
Lamb-Lettuce. 480. *radiata*, Mx. C. & S.
Mich.—Gray; Macomb Co.—Cooley. Rare.

DIPSACEÆ.

(Teasel Family.)

DIPSACUS

- Wild Teasel. 481. *sylvestris*, Mill. C. & S.
Fields and roadsides. Gratiot Co.(!); Ann Arbor; Detroit(!); Flint, etc. Infrequent.

COMPOSITÆ.

(Composite Family.)

VERNONIA

- Iron-Weed. 482. *Baldwinii*, Gr. C. & S.
River banks. Flint; S. Mich.—Wright's Cat. Infrequent.
Iron-Weed. 483. *fasciculata*, Michx. C. & S.
River banks. Ionia Co.(!); Macomb Co.; Lansing, and South Haven—Common.
Bailey.

LIATRIS

- Blazing-Star. 484. *squarrosa*, Willd. (***) C. & S.
Montcalm Co.(!); Macomb Co.; Ann Arbor; Grand Rapids. Dry soil. Infrequent.
Button-Snake-root. 485. *cylindracea*, Michx. C. & S.
Ionia Co.(!); Macomb Co., and southward. Sterile open places. Not common.
Blazing-Star. 486. *scariosa*, Willd. (***) C. & S.
Rarely the flowers vary to white. Dry soil. Frequent.
Blazing-Star. 487. *spicata*, Willd. (***) C. & S.
Gay Feather. Low grounds. Near Lansing; Ionia Co.(!); Macomb Co. Infrequent.
Blazing-Star. 488. *pycnostachya*, Michx. S.
Barrens. Near Mont Lake—Miss Clark; Grand Rapids—Coleman's Cat. Infrequent.

KUHNIA

- Kuhnia. 489. *eupatorioides*, L. C. & S.
Ionia Co.(!); S. Mich.—Winch. Cat. Infrequent.

EUPATORIUM

- Joc-Pye Weed. 490. *purpureum*, L. (***) Th.
Low grounds. Common.
Tall Boneset. 491. *altissimum*, L. (?) S.
Smooth Boneset. 492. *sessilifolium*, L. S.
Copses. Macomb Co.; S. Mich.—Winch. Cat.
Thoroughwort. 493. *perfoliatum*, L. (*) Th.
Boneset. Low grounds. Common.
White Snake-root. 494. *ageratoides*, L. Th.
Woods. Frequent.

CONOCLINIUM

- Mist-Flower. 495. *cælestinum*, DC.
"Rich soil. Michigan."—Gray.

NARDOSMIA

- Sweet Colts-foot. 496. *palmata*, Hook. N.
"Swamps, Michigan, rare."—Gray.

TUSSILAGO

- Coltsfoot. 497. *Farfara*, L. (***)
Sault de Ste. Marie—Whitney's Cat.

ADENOCAULON

- Adenocaulon. 498. *bicolor*, Hook. U. P.
Moist ground. Ontonagon River.

SERICOCARPUS

- White Topped Aster. 499. *conyzoides*, Nees. (?) S.

ASTER

- Starwort. 500. *corymbosus*, Ait. Th.
Aster. Woods. Infrequent.
Large-leaved 501. *macrophyllus*, L. Th.
Aster. Woods. Common.
Silky Aster. 502. *sericeus*, Vent. S.
S. Michigan—Winch. Cat.; Dr. D. Houghton.

BARRENS

- Spreading 503. *patens*, Ait. S. E.
Aster. Dry grounds. Ann Arbor; Macomb Co.
Smooth Aster. 504. *lævis*, L., var. *lævigatus*, Gray. C. & S.
Border of oak woods. Common.
Azure Aster. 505. *azureus*, Lindl. C. & S.
Sterile soil. Flint; Ann Arbor; Ionia Co. (!); Macomb Co. Infrequent.
Wavy Aster. 506. *undulatus*, L. S.
Dry copses. Flint; Lansing (!); S. Mich. Common.
Heart-leaved 507. *cordifolius*, L. Th.
Aster. Woods. Common.
Arrow-leaved 508. *sagittifolius*, Willd. Th.
Aster. Dry grounds. Frequent.
Heath-like 509. *ericoides*, L., var. *villosus*, Gr.
Aster. Dry places. Ann Arbor; Flint; Drummond's Is.
Many-flowered 510. *multiflorus*, Ait. C. & S.
Aster. Sandy soil. Common.
511. *dumosus*, L. L. P.
Thickets. Macomb Co.; Petoskey—Dr. D. Clark.
Tradescants' 512. *Tradescanti*, L. C. & S.
Aster. Low grounds. Frequent.
Dwarf Aster. 513. *miser*, L., Ait. L. P.
Fields. Exceedingly variable. Common.
Pale Aster. 514. *simplex*, Willd. L. P.
Shady banks. Flint, etc. Frequent.
Thin-leaved 515. *tenuifolius*, L. C. & S.
Aster. Low grounds. Flint; Macomb Co. Frequent.
Flesh-colored 516. *carneus*, Nees. L. P.
Aster. Moist soil. Flint; Macomb Co. Frequent.

517. *æstivus*, Ait. Th.
Swamps. Ionia Co. (!); Flint; Macomb Co., etc. Frequent.
- Long-leaved Aster. 518. *longifolius*, Lam. Th.
Moist grounds. Ann Arbor—Winch. Cat.; U. P.—Whitney Cat. Infrequent.
519. *puniceus*, L. Th.
Low grounds. Common.
520. *puniceus*, L., var. *vimineus*, Gray.
Kent Co.; Flint.
- New England Aster. 521. *Novæ-Angliæ*, L. C. & S.
Moist grounds. Worthy of cultivation. Frequent.
- Grass-leaved Aster. 522. *graminifolius*, Pursh. U. P.
"Lake Superior, and northward"—Gray; Dr. Lyons.
523. *acuminatus*, Michx.
S. Mich.—Wright's Cat.; U. P.—Whitney's Cat.
524. *ptarmicoides*, Torr. and Gray. Th.
S. E. Michigan; Macomb Co.; and northward.

ERIGERON

- Horse Weed. 525. *Canadense*, L. (*) Th.
Butter Weed. Waste grounds. Common.
526. *acre*, L. U. P.
"Shores of Lake Superior"—Gray; Dr. A. B. Lyons.
- Robin's Plantain. 527. *bellidifolium*, Muhl. C. & S.
Moist banks. Frequent.
- Common Fleabane. 528. *Philadelphicum*, L. (*) Th.
Low grounds. Common.
529. *glabellum*, Nutt. U. P.
Plains. Dr. A. B. Lyons.
- Daisy Fleabane. 530. *annuum*, Pers. (***) L. P.
Sweet Scabious. Fields. Common.
- Daisy Fleabane. 531. *strigosum*, Muhl. Th.
Fields. Common.

DIPLOPAPPUS

- Double-bristled Aster. 532. *linariifolius*, Hook.
Dry soil. Dr. A. B. Lyons.
- Double-bristled Aster. 533. *umbellatus*, T. & G. Th.
Moist places. Ionia Co. (!); Flint; Macomb Co.; and northward. Frequent.

SOLIDAGO

- Golden-rod. 534. *bicolor*, L.
Macomb Co.; Ionia Co. (!).
- Golden-rod. 535. *bicolor*, L., var. *concolor*, Gr. Th.
Dry places. Ionia Co. (!); Flint; Macomb Co.; and northward. Apparently more common than the species.
- Golden-rod. 536. *latifolia*, L. Th.
Moist woods, frequent. All golden-rods furnish bees with pollen and honey, some, however, more abundantly than others. A great many plants, in fact, furnish bees with honey, and, contrary to a common notion among "bee men," almost every plant one meets, especially if it have showy flowers, is quite likely to be "an excellent bee plant."
- Golden-rod. 537. *cæsea*, L. L. P.
Rich woods. Frequent.
- Golden-rod. 538. *stricta*, Ait.
Swamps. Ingham Co. (!); Ionia Co. (!); and northward. Occurs in great abundance near Lansing. Infrequent.

Golden-rod.	539. <i>speciosa</i> , Nutt.	C. & S. Oak woods. Ionia Co. (!); Flint; Macomb Co.; and southward. Frequent.
Golden-rod.	540. <i>Virga-aurea</i> , L., var. <i>humilis</i> , Gr.	Shores of L. Michigan from So. Haven northward; frequent at Petoskey.
Golden-rod.	541. <i>Virga-aurea</i> , var. L., <i>alpina</i> , Bigel.	U. P. Dr. Gray.
Golden-rod.	542. <i>rigida</i> , L.	C. & S. Dry, sandy ground. Ionia Co. (!); Flint; Ann Arbor; and southward. Worthy of cultivation. Infrequent.
Golden-rod.	543. <i>thyrsoides</i> , E. Meyer.	U. P. "Wooded sides of mountains."—Gray.
Golden-rod.	544. <i>Ohioensis</i> , Riddell.	L. P. Moist meadows. Ionia Co. (!); Flint; Macomb Co.; and northward. Frequent.
Golden-rod.	545. <i>Riddellii</i> , Frank.	L. P. Swamps. Ionia Co. (!); Macomb Co.; and northward. Frequent.
Golden-rod.	546. <i>Houghtonii</i> , Torr. & Gray.	"North shore Lake Michigan."—Gray; Drummond's Is.—Winch. Cat.
Golden-rod.	547. <i>neglecta</i> , T. & Gr.	Swamps. Ionia Co., and northward. Infrequent.
Golden-rod.	548. <i>patula</i> , Muhl.	C. & S. Borders of swamps. Common.
Golden-rod.	549. <i>arguta</i> , Ait.	Th. Meadows and fields, variable. Varieties <i>juncea</i> and <i>scabrella</i> both occur. Frequent.
Golden-rod.	550. <i>Muhlenbergii</i> , Torr. & Gray.	Low grounds. Ionia Co. (!); Flint; Grand Rapids.—Coleman's Cat.
Golden-rod.	551. <i>altissima</i> , L.	Th. Borders of fields. Common.
Golden-rod.	552. <i>ulmifolia</i> , Muhl.	L. P. Borders of woods. Ionia Co. (!); Flint; S. W.—Winch. Cat. Infrequent.
Golden-rod.	553. <i>nemorialis</i> , Ait.	Th. Dry, sandy soil. Common.
Golden-rod.	554. <i>Canadensis</i> , L.	Th. Fields. Common.
Golden-rod.	555. <i>serotina</i> , Ait.	Th. Borders of woods. Frequent.
Golden-rod.	556. <i>gigantea</i> , Ait.	C. & S. Copses and fence rows. Common.
Golden-rod.	557. <i>lanceolata</i> , L.	Th. Moist soil. Frequent.

INULA

Elecampane.	558. <i>Helonium</i> , L. (**)	Roadsides,—escaped from gardens. Infrequent.
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POLYMNIA

Leaf-cup.	559. <i>Canadensis</i> , L.	C. & S. Shaded river banks. Ionia Co. (!); Macomb Co.; Flint; S. Michigan. Infrequent.
Yellow Leaf-cup.	560. <i>Uvedalia</i> , L. (***)	S. S. Michigan,—Wright's Cat.

SILPHIUM

- Rosin-weed. 561. *laciniatum*, L. S.
Compass Plant. S. Mich.—Wright's Cat.
- Prairie Dock. 562. *terebinthaceum*, L. (***) C. & S.
Oak openings. Ionia (!); Macomb Co.; and southward. Infrequent
563. *integrifolium*, Michx.
S. W.—University Herb.
- Cup-plant. 564. *perfoliatum*, L.
S. Mich.—Wright's Cat.

AMBROSIA

- Great Rag-weed. 565. *trifida*, L. (***) C. & S.
Low grounds along Grand and Maple Rivers, abundant, etc.
- Roman Worm-wood. 566. *artemisifolia*. (***) C. & S.
Rag-weed. Roadsides. A worthless weed. Abundant.
Hog-weed.
Bitter-weed.

XANTHIUM

- Common Cocklebur. 567. *strumarium*, L., var. *echinatum*, Gr. (**) C. & S.
Waste places and along river banks. Common.

HELIOPSIS

- Ox-eye. 568. *lævis*, Pers., var. *scabra*, Gr. C. & S.
Banks. Common.

ECHINACEA

- Purple Cone-flower. 569. *purpurea*, Mœnch. S. W.
Univ. Herb.

RUDBECKIA

- Cone-flower. 570. *laciniata*, L. (***) Th.
Low grounds. Frequent.
- Cone-flower. 571. *speciosa*, Wenderoth. C. & S.
Dry soil. Ionia Co. (!); Flint; Macomb Co.; Ann Arbor. Frequent.
- Cone-flower. 572. *fulgida*, Ait. C. & S.
Ann Arbor.—Miss Clark; Grand Rapids.—Coleman's Cat., etc.
- Cone-flower. 573. *hirta*, L. Th.
Dry soil. Common.

LEPACHYS

574. *pinnata*, T. & G. C. & S.
Dry ground. Ionia Co. (!); Grand Rapids; S. Mich. Infrequent.

HELIANTHUS

- Sunflower. 575. *rigidus*, Desf. S.
Dry soil. Ann Arbor.—Winch. Cat.
- Sunflower. 576. *lætiflorus*, Pers.
Grand Rapids.—Coleman's Cat.
- Sunflower. 577. *occidentalis*, Riddell. C. & S.
Sterile soil. Ionia Co. (!); Flint; Grand Rapids; Macomb Co.; etc. Infrequent.
- Sunflower. 578. *giganteus*, L. C. & S.
Low grounds; variable. Ionia Co. (!); Flint; Ann Arbor; Macomb Co. Forms of this and the following species are very puzzling, and the two ought probably to be considered as one polymorphous species. Com.
- Sunflower. 579. *grosse-serratus*, Martens.
Dry plains. Ionia (!); Grand Rapids, etc. Frequent.

Sunflower.	580. <i>divaricatus</i> , L.	C. & S.
	Dry woods.	Common.
Sunflower.	581. <i>strumosus</i> , L.	C. & S.
	Dry soil.	Frequent.
Sunflower.	582. <i>hirsutus</i> , Raf.	C. & S.
	Dry soil. Flint; Grand Rapids,—Coleman's Cat.; Ann Arbor; and S. W.	
Sunflower.	583. <i>trachelifolius</i> , Willd.	C. & S.
	Copses. Grand Rapids,—Coleman's Cat.; S. Mich.—Wright's Cat.	
Sunflower.	584. <i>decapetalus</i> , L.	C. & S.
	Low grounds.	Frequent.
Sunflower.	585. <i>doronicoides</i> , Lam.	C. & S.
	Banks of Maple and Grand River (!); Ann Arbor; and Grand Rapids.	
Jerusalem Artichoke.	586. <i>tuberosus</i> , L.	
	Sparingly escaped from gardens.	

ACTINOMERIS

Actinomeris.	587. <i>squarrosa</i> , Nutt.	S.
	Rich soil. S. Mich.—Wright's Cat.	

COREOPSIS

Coreopsis.	588. <i>lanceolata</i> , L.	
	Sandy shores of Lake Huron; Little Traverse Bay; and Lake Superior.	
	Worthy of cultivation for its showy flowers.	
Coreopsis.	589. <i>verticillata</i> , L.	
	Gray, and Lyons.	
Coreopsis.	590. <i>palmata</i> , Nutt.	
	S. Mich.—Wright's Cat.	
Coreopsis.	591. <i>tripteris</i> , L.	S.
	Detroit(!); Macomb Co.; Oakland Co.(!); S. Mich.—Wright's Cat. Not seen in C. and W. part of the State.	
Coreopsis.	592. <i>aristosa</i> , Michx.	C. & S.
	Swamps. Ionia Co.(!); Lansing (!); Grand Rapids; S. Mich.—Univ. Herb.	Frequent.
Coreopsis.	593. <i>trichosperma</i> , Michx.	C. & S.
	Swamps. Flint; Montcalm Co.(!); Ionia Co.(!); S. Mich.—Wright's Cat. Common in pine country, infrequent elsewhere. Flowers a beautiful golden yellow. Frequently, in September, swamps of large size may be seen so full of this <i>Coreopsis</i> that at a little distance they seem one mass of yellow.	
Coreopsis.	594. <i>discoidea</i> , Torr. & Gray.	
	Wet ground. Ionia Co.	Scarce.

BIDENS

Common Beggarticks.	595. <i>frondosa</i> , L.	C. & S.
	Low grounds. A troublesome weed.	Common.
Swamp Beggarticks.	596. <i>connata</i> , Muhl.	C. & S.
	Low grounds.	Common.
Nodding Bur Marigold.	597. <i>cernua</i> , L.	C. & S.
	Wet places.	Frequent.
Bur-Mari- gold.	598. <i>chrysanthemoides</i> , Michx.	Th.
	Swamps.	Common.
Water Mari- gold.	599. <i>Beckii</i> , Torr.	
	S. Mich.—Wright's Cat.; Ann Arbor; Wexford Co.—Cooley. Not observed in the central part of the State.	

HELENIUM

- Sneeze-weed. 600. *autumnale*, L. (***) C. & S.
River banks. Common.

MARUTA

- Mayweed. 601. *Cotula*, DC. (**) Th.
Dog Fennel. Roadsides, etc. Everywhere very common.

ACHILLEA

- Common 602. *Millefolium*, L. (**) Th.
Yarrow. Fields. Common.

LEUCANTHEMUM

- Ox-eye Daisy. 603. *vulgare*, Lam. Th.
Meadows and pastures. A vile weed, becoming frequent in E. & S. parts
of the State.

MATRICARIA

604. *inodora*, L. Rare.
Flint.

TANACETUM

- Tansy. 605. *vulgare*, L. (**) Frequent.
Escaped from gardens.
606. *Huronense*, Nutt.
Sand dunes at the head of Little Traverse Bay, and northward.
Frequent.

ARTEMISIA

607. *borealis*, Pallas.
"Shore of Lake Superior and northward."—Gray.
Wild Worm- 608. *Canadensis*, Michx. C. N. & U. P.
wood. Sand dunes. Ottawa Co.; Emmet Co.; to Lake Superior.
609. *caudata*, Michx. C. & S.
Sandy fields. Ionia Co. (!); Montcalm Co. (!); S. Haven.—Bailey.
Infrequent.
Western Mug- 610. *Ludoviciana*, Nutt., var. *gnaphalodes*, Gr. S. W.
wort. Dry banks. Niles.—J. T. Scoville; Univ. Herb.
Common Mug- 611. *vulgaris*, L. (***) Infrequent.
wort. Waste places.
Biennial 612. *biennis*, Willd.
Wormwood. A road-side weed, lately introduced and rapidly extending throughout
the State.
Common 613. *Absinthium*, L. (*)
Wormwood. Ionia Co. (!); Flint; Gratiot Co. (!). Sparingly escaped from gardens.
614. *frigida*, Willd. U. P.
"Lake Superior."—Gray.

GNAPHALIUM

- Everlasting. 615. *decurrens*, Ives. Th.
Fields. Abundant in the pine region. Cultivated as an "Immortelle"
in Germany. Common.
Common Ever- 616. *polycephalum*, Michx. (***) Th.
lasting. Fields. Common.
Low Cud- 617. *uliginosum*, L. C. & S.
weed. Roadsides in clayey soil. Frequent.
Purplish C. 618. *purpureum*, L.
Only reported from Macomb Co. by Dr. D. Cooley.

ANAPHALIS

- Pearly Ever-
lasting. 619. *margaritacea*, Benth. & Hook. (***)
Montcalm Co. (!); Petoskey (!); and Mackinac. Infrequent.

ANTENNARIA

- Plantain-
leaved Ever-
lasting. 620. *plantaginifolia*, Hook. Th.
Dry fields. Common.

ERECHTHITES

- Fireweed. 621. *hieracifolia*, Raf. (***) L. P.
New clearings. Common.

CACALIA

- Indian Plan-
tain. 622. *suaveolens*, L.
Lodi.—Miss Clark, in Winch. Cat.
Pale Indian
Plantain. 623. *atriplicifolia*, L. C. & S.
Woods. Ionia Co. (!); S. Mich.—Wright's Cat. Frequent.
Tuberous
Indian Plan-
tain. 624. *tuberosa*, Nutt. S.
S. Mich.—Wright's Cat.

SENECIO

- Common
Groundsel. 625. *vulgaris*, L.
Flint; Macomb Co.; S. W. Mich.—Wright's Cat.
Golden rag-
wort. 626. *aureus*, L. Th.
Squaw-weed. Common.
Life-root. 627. *aureus*, L., var. *obovatus*, Gr.
More common southward.
628. *aureus*, L., var. *Balsamitæ*, Gr. Th.
Dry ground. Abundant northward.

ARNICA

- Arnica. 629. *mollis*, Hook. U. P.
"Shores of Lake Superior and N. W."—Gray; Copper Harbor—Whitney's
Cat.

CNICUS

- Common
Thistle. 630. *lanceolatus*, Hoffm. Th.
Road-sides and fields. Common.
Pitcher's
Thistle. 631. *Pitcheri*, Torr.
Sand dunes. South Haven; and northward to L. Superior; Sand point,
Saginaw Bay. Frequent.
632. *undulatus* (Spreng.). N. & U. P.
"Islands of L. Huron and Michigan."—Gray; Drummond's I.—Winch. Cat.
633. *discolor*, Muhl. C. & S.
Meadows. Montcalm Co. (!); Ionia Co. (!); Flint; and southward. Flowers
sometimes white. Infrequent.
Tall Thistle. 634. *altissimus*, Willd. C. & S.
Dry fields. Ionia Co. (!); Flint; Macomb Co. Infrequent.
Swamp
Thistle. 635. *muticus*, Ph. Th.
Swamps. Flowers sometimes white. Frequent.
Pasture
Thistle. 636. *pumilus*, Torr. S.
S. W. Mich.—Wright's Cat.; Grand Rapids—Coleman's Cat.
Canada
Thistle. 637. *arvensis*, Hoffm. Th.
Fields. A vile pest. Infrequent in centre of the State, but increasing
rapidly, and already troublesome in some localities. Our Canada thistle
law ought to be rigidly enforced.

ONOPORDON

- Cotton, or Scotch Thistle. 638. *Acanthium*, L. .
Grand Rapids (!). Rare.

LAPPA

- Burdock. 639. *officinalis*, All., var. *major*, Gr. (**)
Waste places. Th.
Common.

CICHORIUM

- Succory or Chicory. 640. *Intybus*, L. (***) Th.
Ionia Co.(!); Flint; Detroit, etc. Roadsides. Infrequent.

KRIGIA

- Dwarf Dandelion. 641. *Virginica*, Willd.
Barrens. N. part of Clare Co.(!)

CYNTHIA

- Cynthia. 642. *Virginica*, Don. C. & S.
Moist hillsides. Frequent.

HIERACIUM

- Canada Hawkweed. 643. *Canadense*, Michx. (***) Th.
Woods. Frequent.
- Rough Hawkweed. 644. *scabrum*, Michx. (***) Th.
Woods. Common.
- Long-bearded Hawkweed. 645. *longipilum*, Torr. L. P.
Fields. Macomb Co.; Traverse City; S. W.—Wright Cat. Scarce.
- Hairy Hawkweed. 646. *Gronovii*, L. (***) C. & S.
Dry soil. Ionia Co.(!); Flint; Macomb Co.; S. W. Mich.—Wright Cat. Infrequent.
- Rattlesnake weed. 647. *venosum*, L. (***) L. P.
Dry soil in pine woods, or on oak land. A form has been seen at Ionia not having purple veins in the root leaves. Frequent.
- Panicled Hawkweed. 648. *paniculatum*, L. C. & S.
Lansing(!); Macomb Co.; S. Mich.—Wright Cat. Scarce.

NABALUS

- White Lettuce. 649. *albus*, Hook. (***) Th.
Woods. Common.
- Tall White Lettuce. 650. *altissimus*, Hook. Th.
Rich woods. Frequent.
651. *racemosus*, Hook. Th.
Flint; Macomb Co.; shore of L. Mich., near Sitting Rabbit—Winch. Cat.; S. W.—Wright Cat., etc.
652. *asper*, Torr. & Gray. (?) S.

TARAXICUM

- Dandelion. 653. *Dens-leonis*, Desf. (*) Th.
Fields everywhere.

LACTUCA

- Wild Lettuce. 654. *Canadensis*, L. Th.
Rich soil. Frequent.
- Wild Lettuce. 655. *integrifolia*, Bigel. (?)
- Wild Lettuce. 656. *sanguinea*, Bigel. C. & S.
Hubbardston(!); Gratiot Co.(!), etc. Common.
- False blue Lettuce. 657. *foliosa*.
Flint; Macomb Co.; and northward to L. Superior.

- Wild Lettuce. 658. *pulchella*, DC. U. P.
 "Upper Michigan,"—Prof. Porter.
 Wild Lettuce. 659. *villosa*, Jacq.
 Macomb Co.—Dr. D. Cooley.
 Wild Lettuce. 660. *Floridana*, Gærtn.
 Grand Rapids—Coleman's Cat.

SONCHUS

- Common Sow- 661. *oleraceus*, L.
 Thistle. Waste places. Macomb Co.; Montcalm Co. (!); northward to L. Superior.
 Frequent.
 Spiny-leaved 662. *asper*, Vill.
 Sow-Thistle. Waste places. Th.
 Frequent.
 Field Sow- 663. *arvensis*, L.
 Thistle. Grand Rapids—Coleman's Cat.

LOBELIACEÆ.

(Lobelia Family.)

LOBELIA

- Cardinal 664. *cardinalis*, L. (***) Th.
 Flower. River banks. Flowers rarely rose-colored or even white. Showy and
 easily cultivated. Common.
 Great Lobelia. 665. *syphilitica*, L. (***) L. P.
 Blue Lobelia. Low grounds. Flowers vary to white. Common.
 666. *Dortmanna*, L. U. P.
 Isle Royale—Dr. A. B. Lyons.
 667. *spicata*, Lam. L. P.
 Oak openings. Frequent.
 Kalm's Lo- 668. *Kalmii*, L. Th.
 belia. Wet banks, and rocks along shore. Ionia Co. (!); Ann Arbor; Oakland
 Dwarf Blue L. Co. (!); Petoskey (!); to L. Superior. Frequent.
 Indian To- 669. *inflata*, L. (*) C. & S.
 bacco. Pastures. Montcalm Co. (!); Flint; Macomb Co.; Oakland Co. (!); Put-in
 Bay. Scarce.

CAMPANULACEÆ.

(Bell-flower Family.)

SPECULARIA

- Venus's Look 670. *perfoliata*, A. DC. C. & S.
 ing-glass. Gravelly fields. Clinton Co. (!); S. E.—University Herb, etc. Scarce.

CAMPANULA

- Harebell. 671. *rotundifolia*, L. Th.
 Bluebell. A very pretty species, worthy to be cultivated in every garden. A can-
 escent form grows at Burt's Lake, Cheboygan Co.—var. *canescens*,
 Hill. Sandy banks and lake shores. Common.
 Marsh Bell- 672. *aparinoides*, Ph. Th.
 flower. Wet grassy grounds. Common.
 Tall Bell- 673. *Americana*, L. C. & S.
 flower. Moist woodlands. Ionia Co. (!); Flint; Macomb Co.; Ann Arbor—Winch.
 Cat. Frequent.

ERICACEÆ.

(Heath Family.)

GAYLUSSACIA

- Blue Tangle, or Blue Huckleberry. 674. *frondosa*, Torr. & Gray. C. & S.
Low copses. Flint; Ypsilanti (!); Ann Arbor—Winch. Cat. Scarce.
- Black Huckleberry. 675. *resinosa*, Torr. & Gray. Th.
Hillsides. Frequent.

VACCINIUM

- Dwarf Blueberry. 676. *Pennsylvanicum*, Lam. Th.
Dry hills and barrens. "The lowest and earliest-fruited of the blueberries"—Gray, Synopt. Flora of N. A. Common.
- Canada Blueberry. 677. *Canadense*, Kalm. Th.
Swamps. Common.
- Low Blueberry. 678. *vacillans*, Solander. Th.
Barrens. Common northward, but rare in C. & S. This species furnishes large quantities of berries for market in the northern lake region.
- Swamp Blueberry. 679. *corymbosum*, L. Th.
Swamps. Yielding abundantly; variable. Common.
680. *uliginosum*, L. U. P.
"Shore of Lake Superior"—Gray; Isle Royale and White Fish Pt., L. Superior—Henry Gillman.
- Bilberry. 681. *cæspitosum*, Michx., var. *cuneifolium*, Nutt. U. P.
Gray, Fl. N. A.; Lyons.
682. *myrtilloides*, Hook. U. P.
"Damp woods L. Superior."—Gray, Fl. N. A.
683. *ovalifolium*, Smith. U. P.
Woods Lake Superior, S. shore—Robbins.
684. *Vitis-Idæa*, L. (?)
N. shore L. Superior—Dr. A. B. Lyons; and probably in our district.
685. *Oxycoccus*, L. Th.
Sphagnous Swamps. Ann Arbor; Ionia Co. (!); and northward. Infrequent.
686. *macrocarpon*, Ait. Th.
Bogs. The common Cranberry of the market. Common.

CHIOGENES

- Creeping Snowberry. 687. *hispidula*, Torr. and Gray. Th.
S. Mich.—Wright's Cat; Ionia Co. (!); Montcalm Co. (!); Petoskey (!), etc. Infrequent.

ARCTOSTAPHYLOS

- Bearberry. 688. *Uva-ursi*, Spreng. (*) Th.
Sandy soil. Abundant northward, but rare S. of lat. 43°.

EPIGÆA

- Trailing Arbutus. May Flower. Ground Laurel. 689. *repens*, L. (***) Th.
Borders of marshes, and woods in sandy soil. Rare S., frequent in C., and common northward. Specimens with double flowers were found in the vicinity of Hubbardston in 1879.

GAULTHERIA

- Wintergreen. Checkerberry. 690. *procumbens*, L. (*) Th.
Low woods, and borders of swamps. Common.

ANDROMEDA

- Wild Rosemary. 691. *polifolia*, L. Th.
Sphagnous swamps, S. Mich.—Wright's Cat; Ionia Co. (!). Frequent.

CASSANDRA

- Leather-leaf. 692. *calyculata*, Don. Th.
Swamps. Common.

KALMIA

- Sheep Laurel. 693. *angustifolia*, L. (***)
Lamb-kill. Hillsides. Tawas City and Thunder Bay, common—Winch. Cat.
Swamp Laur'l. 694. *glauca*, Ait. (***) Th.
Bogs. S. Mich.—Wright Cat.; Ionia Co.(!); Macomb Co.; northward.
Infrequent.

LEDUM

- Labrador Tea. 695. *latifolium*, Ait. (***) C. N. & U. P.
Swamps and bogs. Common northward, but not observed south of Far-
well, Clare Co.

CHIMAPHILA

- Pipsissewa. 696. *umbellata*, Nutt. (*) Th.
Prince's Pine. Pine woods. Common.
Spotted 697. *maculata*, Pursh. (***) C. & S.
Wintergreen. Oak woods. Ionia(!); Bangor and South Haven, Van Buren Co.; Flint.
Rare or local.

MONESES

- Moneses. 698. *uniflora*, Gray.
One-flowered Pyrola. Pine forests. Flowers very fragrant when a little wilted. Montcalm
Co.(!); Flint; Ft. Gratiot—Winch. Cat.; and northward. Rare.

PYROLA

- Shin-leaf. 699. *minor*, L. U. P.
Wintergreen. "Cold woods, L. Superior"—Gray.
Shin-leaf. 700. *secunda*, L. Th.
Wintergreen. Rich woods. Common.
Shin-leaf. 701. *chlorantha*, Swartz. C. N. & U. P.
Wintergreen. Pine woods. Rare south of lat. 43° Frequent.
Shin-leaf. 702. *elliptica*, Nutt.
Wintergreen. Rich woods. Ann Arbor; Ionia Co.(!); northward to L. Superior.
Common.
Pear-leaf 703. *rotundifolia*, L. Th.
Wintergreen. Dry oak woods. Common.
704. *rotundifolia*, L., var. *asarifolia*, Hook.
The Cove, L. Huron—Winch. Cat.
705. *rotundifolia*, L., var. *uliginosa*, Gray.
L. Superior—Prof. J. Macoun.

PTEROSPORA

- Pine-drops. 706. *andromeda*, Nutt.
Sitting Rabbit—Winch. Cat.; Carp river, U. P.—Whitney Cat.

MONOTROPA

- Indian Pipe. 707. *uniflora*, L. Th.
Corpse-plant. Damp woods. Frequent.
Pine Sap. 708. *Hypopitys*, L.
False Beech- drops. Oak and pine woods. Macomb Co.; Ft. Gratiot—Austin; to Ontonagon
River, L. Superior—Whitney Cat. Infrequent.

AQUIFOLIACEÆ.

(Holly Family.)

ILEX

Black Alder.
Winterberry.709. *verticillata*, Gray. (**)

Th.

Low grounds. The bright red berries are very noticeable in swamps during the winter. This shrub is readily transplanted, and should be oftener planted in small grounds.

NEMOPANTHES

Mountain
Holly.710. *Canadensis*, DC.

Th.

Borders of swamps. S. Mich.—Wright Cat.; Ionia Co.(!); Montcalm Co.(!); Flint; Macomb Co.; and northward. Frequent.

PLANTAGINACEÆ.

(Plantain Family.)

PLANTAGO

711. *cordata*, Lam.

C. & S.

Borders of streams. S. Mich.—Wright Cat.; Tuscola Co.—Winch. Cat.; Ionia Co.(!); Clinton Co.(!); Flint; Macomb Co. Frequent.

Common
Plantain.712. *major*, L. (***)

Th.

Waysides and about dwellings everywhere. Decaisne's variety *minima* occurs in salt marshes,—Maple river, Clinton Co., etc. Common.713. *Rugelii*, Decaisne.

Waste places. Often confounded with the previous species. Frequent.

Ripple-grass.
Rib-grass.
English
Plantain.714. *lanceolata*, L. (***)

C. & S.

Meadows and fields.

Too common.

715. *Virginica*, L. (?)

Coleman Cat.

PRIMULACEÆ.

(Primrose Family.)

DODECATHEON

Shooting Star.
American
Cowslip.716. *Meadia*, L.

S.

Moist, shaded grounds. Gray, Flora of N. A.; Dr. A. B. Lyons.

PRIMULA

Primrose.

717. *farinosa*, L.

N. & U. P.

Shores of Little Traverse Bay(!); Drummond's Island—Winch. Cat.; L. Superior—Whitney Cat.

718. *Mistassinica*, Mx.

S. E.—University Herb; Lake Superior—Whitney Cat.

TRIENTALIS.

Star-flower.
Chickweed-
Wintergreen.719. *Americana*, Pursh.

Th.

Damp woods.

Common.

STEIRONEMA

Loosestrife.

720. *ciliatum*, Raf.

Th.

Swamps.

Common.

Loosestrife.

721. *lanceolatum*, Gray, var. *hybridum*, Gr.

C. & S.

Low grounds. Exceedingly variable.

Frequent.

Loosestrife.

722. *longifolium*, Gray.

C. & S.

Banks of streams. Ann Arbor and Ft. Gratiot—Winch. Cat.; Ionia Co.(!); Flint, etc. Frequent.

LYSIMACHIA

- Loosestrife. 723. *quadrifolia*, L. C. & S.
Sandy soil. Ann Arbor—Winch. Cat.; Ionia Co.(!); Montcalm Co.(!); Flint; Macomb Co.
- Loosestrife. 724. *stricta*, Ait. Th.
Borders of marshes. A form of this species was found in a sphagnous swamp near Hubbardston, bearing bulblets in the axils instead of flowers. Frequent.
- Tufted Loose-
strife. 725. *thyrsiflora*, L. Th.
Swampy soil. Common.

ANAGALLIS

- Common
Pimpernel. 726. *arvensis*, L. (***)
Ann Arbor—Mary H. Clark.

SAMOLUS

- Water Pim-
pernel. 727. *Valerandi*, L., var. *Americanus*, Gray.
Springy places. Common along Maple river(!); Flint; Macomb Co.; N. W.,—University Herb.

LENTIBULACEÆ.

(Bladderwort Family.)

UTRICULARIA

- Bladderwort. 728. *vulgaris*, L. Th.
Slow streams. Throat of corolla orange, veined with brown-purple. Frequent.
- Bladderwort. 729. *minor*, L. Th.
Shallow water. Ann Arbor—Winch. Cat.; Hubbardston(!); Montcalm Co.(!).
- Bladderwort. 730. *intermedia*, Hayne. Th.
Shallow water. Ann Arbor—Winch. Cat.; Macomb Co.; northward. Infrequent.
- Bladderwort. 731. *gibba*, L.
Old Mission, Grand Traverse Co.—E. J. Hill.
- Bladderwort. 732. *resupinata*, B. D. Greene.
Very abundant on the east shore of Woodard lake, in Ionia Co., the only known locality in the State. Was found near Erie, Pa., last year. Dr. Wright's *U. purpurea* is probably this species.

PINGUICULA

- Butterwort. 733. *vulgaris*, L. U. P.
Wet rocks. Whitney's Catalogue; Isle Royale,—Dr. A. B. Lyons.

OROBANCHACEÆ.

(Broom-rape Family.)

APHYLLON

- One-flowered
Cancer-root. 734. *uniflorum*, Gray. (***) Th.
Damp woodlands. S. Mich.—Wright Cat.; Flint; Lake Superior.—Whit. Infrequent.
735. *fasciculatum*, Gray.
"Sandy ground, Lake Michigan,"—Gray.

CONOPHOLIS

- Squaw-root. 736. *Americana*, Wallr. (***)
Moist Woods. Ann Arbor; S. Mich.—Wright Cat.; Ionia Co.(!); Flint; Macomb Co.

EPIPHEGUS

- Beech-drops. 737. *Virginiana*, Bart. (***)
Cancer-root. Beech woods. Ionia Co.(!); Flint; Macomb Co., etc. Very common in Grand-Saginaw Valley.

SCROPHULARIACEÆ.

(Figwort Family.)

VERBASCUM

- Common 738. *Thapsus*, L. (***) L. P.
Mullein. Fields and road sides everywhere,—a common weed. Cultivated in Eng-
land under the name of Aaron's Rod.
Moth Mullein. 739. *Blattaria*, L.
Road sides. S. Mich.; Ionia Co.(!); Detroit(!); Lansing(!), etc.

LINARIA

- Wild Toad- 740. *Canadensis*, Dumont.
Flax. S. shore of Saginaw Bay—Winch. Cat.; Barrens, in Clare Co. (!).
Infrequent or wanting in C. and S. Mich.
Toad-Flax, 741. *vulgaris*, Mill. (***)
Butter and Road sides. Spreading from cultivation, but not yet a troublesome weed.
Eggs.

COLLINSIA

- Innocence. 742. *verna*, Nutt. C. & S.
Collinsia. A beautiful little annual with blue and white flowers; worthy of cultiva-
tion. Moist woods. Ann Arbor—Winch. Cat.; S. W.—Wright's Cat.;
Ionia Co.(!), and probably reaches its N. limits in Gratiot Co.(!)
743. *parviflora*, Dougl. U. P.
"Shady, moist ground, Upper Michigan."—Gray Fl. N. A.

SCROPHULARIA

- Figwort. 744. *nodosa*, L. (***) C. & S.
"Simpson's Rich soil. A valuable honey plant. Frequent.
Honey Plant."

CHELONE

- Snake Head. 745. *glabra*, L. (***) Th.
Turtle Head. Borders of streams. Frequent.
Balmony.

PENTSTEMON

- Beard-tongue. 746. *pubescens*, Solander. C. & S.
Dry soil. Ann Arbor—Winch. Cat.; Ionia Co.(!); Flint; Macomb Co.
Common.
Beard-tongue. 747. *lævigatus*, Solander, var. *Digitalis*, Gr. (?)
May occur in the S.

MIMULUS

- Monkey- 748. *ringens*, L. Th.
flower. Wet places. Common.
Monkey- 749. *alatus*, Solander.
flower. S. W.—Wright Cat.
Monkey- 750. *Jamesii*, Torr. & Gray.
flower. Abundant at Mackinac—Winch. Cat.; "Upper Michigan."—Gray. This
species reaches its S. limits (?) in Ionia Co.(!), where it is rarely found
growing near cool springs.

GRATIOLA

- HedgeHyssop. 751. *Virginiana*, L. (?)
S. Mich.—Winch. Cat.

ILYSANTHES

- False Pimper- 752. *gratioloides*, Benth. C. & S.
nel. Low grounds. Frequent.

LIMOSELLA

- Mudwort. 753. *aquatica*, L., var. *tenuifolia*, Hoffmann.
Dr. A. B. Lyons.

SYNTHYRIS

- Synthyris. 754. *Houghtoniana*, Benth.
Oak barrens. S. Mich.—Wright's Cat.; Ionia Co.(!), three miles S. of
Saranac. Probably reaches here its N. limits. Rare.

VERONICA

- Culver's 755. *Virginica*, L. (*) C. & S.
Physic. Rich woods. Furnishes the officinal *Leptandrin*. Common.
- Water Speed- 756. *Anagallis*, L. C. & S.
well. Ditches. Frequent.
- American 757. *Americana*, Schweinitz. (***) Th.
Brookline. Brooks. Common.
- Marsh Speed- 758. *scutellata*, L. Th.
well. Swamps. Frequent.
- Common 759. *officinalis*, L. (***) S.
Speedwell. Dry hills. Ann Arbor—Winch. Cat. Scarce.
- Alpine Speed- 760. *alpina*, L. U. P.
well. Winchell Cat.
- Thyme-leaved 761. *serpyllifolia*, L. Th.
Speedwell. Open grounds. Frequent.
- Purslane 762. *peregrina*, L. Th.
Speedwell. Moist grounds everywhere. Common.
- Corn Speed- 763. *arvensis*, L. C. & S.
well. Cultivated and waste grounds. Common.
- Neckweed. 764. *agrestis*, L. Rare.
Sandy fields. Coleman Cat.; and Flint.
765. *Buxbaumii*, Tenore.
Waste grounds. Coleman Cat.

BUCHNERA

- Blue-hearts. 766. *Americana*, L. C. & S.
Moist sandy ground. S. W.—Wright Cat.; Flint; Coleman Cat. Infrequent.

GERARDIA

- Lousewort 767. *pedicularia*, L. L. P.
Foxglove. Woods. Frequent.
- Downy Fox- 768. *flava*, L. C. & S.
glove. Open woods. Frequent.
- Smooth Fox- 769. *quercifolia*, Pursh. C. & S.
glove. Oak woods. Frequent.
- Gerardia. 770. *auriculata*, Michx. S.
Wright Cat.
- Gerardia. 771. *laevigata*, Raf. S.
Coleman Cat.; Flint; Dr. Lyons.
- Purple Gerar- 772. *aspera*, Douglas. C., N. & U. P.
dia. Low ground. Ionia Co.(!); Montcalm Co.(!); Sitting Rabbit—Winch. Cat.
This species probably reaches its E. limits in Ionia Co.

- Purple Gerardia. 773. *purpurea*, L. L. P.
 Moist, sandy ground near the Great Lakes.
774. *purpurea*, L., var. *paupercula*, Gr.
 Oakland Co. (!)
- Slender Gerardia. 775. *tenuifolia*, Vahl.
 Ann Arbor—Winch. Cat.
- Slender Gerardia. 776. *tenuifolia*, Vahl., var. *asperula*, Gr.
 See Bot. Gazette, vol. 4, no. 5.

CASTILLEIA

- Scarlet Painted-cup. 777. *coccinea*, Spreng. Th.
 Wet and dry grounds. Varies in color of bracts from scarlet to yellow.
 Common.
778. *pallida*, Kunth, var. *septentrionalis*, Gray.
 Lake Superior—Gray.

EUPHRASIA

- Eyebright. 779. *officinalis*, L. (***) U. P.
 "Shore of Lake Superior."—Gray; Isle Royale.—Whitney Cat.

PEDICULARIS

- Lousewort. 780. *Canadensis*, L. Th.
 Moist banks and woodlands. Common.
- Lousewort. 781. *lanceolata*, Michx. C. & S.
 Swamps. Frequent.

RHINANTHUS

- Yellow-Rattle. 782. *Crista-galli*, L. U. P.
 "Lake Superior."—Gray, Fl. N. A.

MELAMPYRUM

- Cow-Wheat. 783. *Americanum*, Michx. Th.
 Sandy woods. Common.

ACANTHACEÆ.

(*Acanthus* Family.)

RUELLIA

- Ruellia. 784. *ciliosa*, Pursh. S.
 Dry grounds. Wright Cat.]
- Ruellia. 785. *strepens*, L. S.
 Dry soil. Wright Cat.

DIANTHERA

- Water Willow. 786. *Americana*, L. S.
 In shallow water. Ann Arbor—Winch. Cat.; Put-in-Bay (!); S. Haven—Bailey.

VERBENACEÆ.

(*Verbena* Family.)

PHRYMA

- Lopseed. 787. *Leptostachya*, L. C. & S.
 Moist woods. Pt. au Chene—Winch. Cat.; Flint; Macomb Co.; S. Mich.—Wright Cat.; Ionia Co. (!)
 Infrequent.

VERBENA

- White Vervain. 788. *urticifolia*, L. (***) Th.
Waste places. Common.
- Narrow Leaved Vervain. 789. *angustifolia*, Michx. S.
Dry grounds. Winch. Cat.
- Blue Vervain. 790. *hastata*, L. (***) Th.
Roadsides. Common.
791. *bracteosa*, Michx.
Waste places. Coleman Cat.; Kalamazoo—Bailey.

LIPPIA

- Frog-Fruit. 792. *lanceolata*, Michx. (?)
Coleman Cat.

LABIATÆ.

(Mint Family.)

TEUCRIUM

- Germander. 793. *Canadense*, L. (***) C. & S.
Wood Sage. Low grounds. Common.

COLLINSONIA

- Horse-weed. 794. *Canadensis*, L. C. & S.
Stone-root. Rich woods. Ionia Co.(!); Flint; Detroit; Ann Arbor; and S. W.—Winch.
Rich-weed. Cat. Frequent.

MENTHA

- Spearmint. 795. *viridis*, L. (*) Frequent.
Roadsides. Escaped from cultivation.
- Peppermint. 796. *piperita*, L. (*) Th.
Along streams. Extensively cultivated in St. Joseph and Wayne counties for the oil. Michigan produces about two-fifths of the world's crop. St. Joseph county leads in production, followed by Wayne county, and then by Wayne county, N. Y., which is the only other locality in the United States where peppermint is grown to great extent. The annual production in Michigan varies greatly, ranging from 20,000 to 60,000 pounds of oil. Some growers estimate the yield, in exceptionally favorable years, as high as 75,000 pounds. In severe seasons the plants are very apt to winter kill.—T. F. Wood, *et al.* Common.
- Horse-mint. 797. *Canadensis*, L. Th.
Low grounds. Common.

LYCOPUS

- Bugle-weed. 798. *Virginicus*, L. (**) Th.
Low grounds. Common.
- Water Horehound. 799. *sinuatus*, Ell. Th.
Frequent.
- Water Horehound. 800. *rubellus*, Mœnch. (***) Infrequent.
Clinton Co.(!)

HYSSOPUS

- Hyssop. 801. *officinalis*, L. (***)
Escaped from gardens. Flint; S. W.—Winch. Cat.

PYCNANTHEMUM

- Basil. 802. *lanceolatum*, Pursh. C. & S.
Low grounds. Ionia Co. (!); Flint; Macomb Co.; and southward. Frequent.
- Basil. 803. *linifolium*, Pursh. S.
Ann Arbor—Winch. Cat.

THYMUS

- Creeping Thyme. 804. *Serpyllum*, L. (***)
Flint; Coleman Cat. Scarcely escaped from gardens.

CALAMINTHA

- Calaminth. 805. *Nuttallii*, Benth.
Drummond's Island, and northward, common. Not seen in C. of the State; S. E.—Wright Cat.
- Basil. 806. *Clinopodium*, Benth.
Fields. Ionia Co. (!); Fort Gratiot.—Winch. Cat.; and northward to Lake Superior.

HEDEOMA

- American Pennyroyal. 807. *pulegioides*, Pers. (*) C. & S.
Fields. Hubbardston (!); S. Mich.—Wright Cat; Macomb Co. Scarce.

MONARDA

- Bee-Balm. Oswego Tea. 808. *didyma*, L. (***)
Rare in Michigan, only reported from one locality: Fort Gratiot—Winch. Cat.
- Wild Bergamot. 809. *fistulosa*, L. (***) Th.
Sandy soil. An extract of this aromatic plant has lately been introduced as a "sure cure" of malarial fever. The flowers are sometimes pure white, in which case the albinism extends to the stems also, which are green instead of the usual reddish-brown or purple. Common.
- Horse-mint. 810. *punctata*, L. (*) S.
Sandy soil. S. Mich.—Wright Cat.; S. Haven—Bailey. Infrequent.

BLEPHILIA

- Blephilia. 811. *ciliata*, Raf. L. P.
Dry ground. Ionia Co. (!); Ann Arbor, and Sault Ste. Marie—Winch. Cat Scarce.
- Blephilia. 812. *hirsuta*, Benth. C. & S.
Low woods. Ionia Co. (!), where it is frequent; S. Mich.—Wright Cat.

LOPHANTHUS

- Giant Hyssop. 813. *nepetoides*, Benth. C. & S.
Low grounds. Ionia Co. (!); Flint; Lansing (!); S. W.—Wright Cat; Grosse Isle—Miss Clark. Infrequent.
- Giant Hyssop. 814. *scrophulariaefolius*, Benth. C. & S.
Low grounds. S. Mich.—Wright Cat.; Macomb Co. Infrequent.

NEPETA

- Catnip. Cat-mint. 815. *Cataria*, L. (*) Th.
Near dwellings. An excellent honey plant. Common.
- Ground Ivy. Gill. 816. *Glechoma*, Benth. (***) C. & S.
Sparingly escaped from culture. Flint; Grand Rapids—Coleman Cat.

DRACOCEPHALUM

- Dragon-head. 817. *parviflorum*, Nutt.
This interesting plant was first detected in the Lower Peninsula in June, 1876, when it was found in Roscommon Co., a little south of Houghton Lake. Its range is northward to Lake Superior.—Gray.

SCUTELLARIA

- Mad-dog Skullcap. 818. *lateriflora*, L. (*) Th.
Low grounds. Gathered to considerable extent for the drug trade. Common.
- Skullcap. 819. *versicolor*, Nutt. S.
Banks of streams. S. Mich.—Wright Cat.
- Skullcap. 820. *canescens*, Nutt. (?) S.
Coleman Cat., etc.

- Skullcap. 821. *pilosa*, Michx. S. W.
S. W.—Winch. Cat.; Gray, Fl. N. A.
- Skullcap. 822. *parvula*, Michx.
Ionia (!). Infrequent.
- Skullcap. 823. *galericulata*, L. (**)
Low grounds. Th.
Common.
- BRUNELLA
- Self-heal, or 824. *vulgaris*, L. (***) Th.
Heal-all. Fields. Occasionally the flowers are white. Common.
- PHYSOSTEGIA
- False Dragon 825. *Virginiana*, Benth. C. & S.
Head. Wet grounds; cultivated in gardens; varies greatly. Ann Arbor—Winch.
Cat.; S. W.—Wright Cat.; Muir (!); Kalamazoo—Bailey. Occasional.
- MARRUBIUM
- Horehound. 826. *vulgare*, L. (*)
Roadsides escaped from cult. Ionia Co. (!); Flint; S. Mich.—Winch.
Cat. Frequent.
- LEONURUS
- Motherwort. 827. *Cardiaca*, L. (***) L. P.
Waste grounds. Much visited by bees for its honey. Common.
- LAMIUM
- Dead-Nettle. 828. *amplexicaule*, L. (***)
Ionia (!), common.
- GALEOPSIS
- Hemp Nettle. 829. *Tetralit*, L. (***) Th.
Rare in C. of the State. Abundant at Mackinac—Winch. Cat.
- Red Hemp 830. *Ladanum*, L.
Nettle. Ft. Gratiot and Sault Ste. Marie—Winch. Cat.
- STACHYS
- Hedge Nettle. 831. *aspera* Michx. S.
Wet grounds. Frequent.
- Hedge Nettle. 832. *hyssopifolia*, Michx. Th.
Wet grounds. S. Mich.—Wright Cat.

BORRAGINACEÆ.

(Borrage Family.)

CYNOGLOSSUM

- Hounds- 833. *officinale*, L. (***) Th.
tongue. Roadsides. Frequent.
- Wild Com- 834. *Virginicum*, L. Th.
frey. Open Woods. Frequent.

ECHINOSPERMUM

- Beggars' Lice. 835. *Virginicum*, Lehm. Th.
Woods. Frequent.
- Stick-seed. 836. *Lappula*, Lehm. L. P.
A worthless weed along roadsides and in waste places.

MERTENSIA

- Smooth Lung-
wort. 837. *Virginica*, DC. (***)
Common in gardens. Coleman Cat.; Lyons.
838. *paniculata*, Don.
Whitney Cat.; Gray, Fl. N. A.

U. P.

MYOSOTIS

- Forget-me-
not. 839. *verna*, Nutt.
Winch. Cat.; Coleman Cat., etc.

LITHOSPERMUM

- Wheat Thief.
Red-root.
Corn Grom-
well. 840. *arvense*, L. C. & S.
In wheat fields. A bad weed which is being rapidly distributed by
threshing machines. Farmers should be on their guard. It may be
known by its branching stems, narrow, rough leaves, small white flow-
ers, and gray, bony seeds.
- Common
Gromwell. 841. *officinale*, L. (***) Th.
Roadsides. Infrequent.
- Broad-leaved
Gromwell. 842. *latifolium*, Michx. C. & S.
Borders of woods. S. Mich.—Winch. Cat.; Ionia Co.(!); Flint, etc.
Frequent.
- Hoary
Puccoon. 843. *canescens*, Lehm. Th.
Sandy fields. Ann Arbor.—Winch. Cat.; Ionia Co.(!); Macomb Co.
- Hairy
Puccoon. 844. *hirtum*, Lehm. Th.
Light sand. Flowers bright yellow, showy. Frequent.
845. *angustifolium*, Michx. (?)
Credited to the State by Dr. A. B. Lyons, and may be looked for in the
extreme S. W.

ONOSMODIUM

- False
Gromwell. 846. *Carolinianum*, DC.
Only noticed by Dr. D. Cooley, Macomb Co.

SYMPHYTUM

- Comfrey. 847. *officinale*, L. (***)
Escaped from gardens. Infrequent.

BORRAGO

- Bororage. 848. *officinalis*, L.
Adv. on Agricultural College grounds, Lansing. A honey plant.

HYDROPHYLLACEÆ.

(Waterleaf Family.)

HYDROPHYLLUM

- Waterleaf. 849. *Virginicum*, L. C. & S.
Rich woods. Frequent.
- Waterleaf. 850. *Canadense*, L. C. & S.
Damp rich woods. Frequent.
- Hairy Water-
leaf. 851. *appendiculatum*, Michx. C. & S.
Moist hillsides and rich woods. Frequent.

PHACELIA

852. *Franklinii*, Gray.
"Shores of L. Superior, especially on Isle Royale."—Gray; and Dr. A. B.
Lyons.

POLEMONIACEÆ.

(Phlox Family.)

PHLOX

- | | | |
|----------------------|--|---------|
| Hairy Phlox. | 853. pilosa, L. | C. & S. |
| | Dry, sandy fields. Flowers bright rose, or rarely pure white. Deserves a place in the garden. Ann Arbor—Winch. Cat.; Ionia Co.(!); Flint; Macomb Co., etc. | |
| Divaricate Phlox. | 854. divaricata, L. | C. & S. |
| | Woods and fields. | Common. |
| Ground or Moss Pink. | 855. subulata, L. | |
| | S. Mich.—Winch. Cat. Common in cultivation. | |

CONVOLVULACEÆ.

(Convolvulus Family.)

IPOMEA

- | | | |
|--|-------------------------------------|---------|
| Wild Potato-vine.
Man-of-the-Earth. | 856. pandurata, Meyer. (***) | C. & S. |
| | Ann Arbor—Winch. Cat.; Coleman Cat. | |

CONVOLVULUS

- | | | |
|------------------|-----------------------------|-------------|
| Low Bind-weed. | 857. spithameus, L. | Th. |
| | Sandy fields. | Infrequent. |
| Hedge Bind-weed. | 858. sepium, L. | Th. |
| | Low grounds. Very variable. | Common. |

CUSCUTA

- | | | |
|---------|--|-----------|
| Dodder. | 859. chlorocarpa, Engelmann. | S. W. |
| | S. Haven—Mrs. Millington. | |
| Dodder. | 860. Gronovii, Willd. | C. & S. |
| | Low grounds. | Frequent. |
| Dodder. | 861. glomerata, Choisy. (?) | |
| | "Wet prairies, Ohio to Wisconsin."—Gray. | |
| Dodder. | 862. tenuiflora, Engelm. | C. & S. |
| | Maple River valley(!); Coleman Cat. | |

SOLANACEÆ.

SOLANUM

- | | | |
|--------------------------------|---------------------------|-------------|
| Common Nightshade.
Black N. | 863. nigrum, L. (***) | C. & S. |
| | Moist, cultivated fields. | Common. |
| Bittersweet. | 864. Dulcamara, L. (*) | C. & S. |
| | Roadsides. | Infrequent. |

PHYSALIS

- | | | |
|----------------|--|------------|
| Ground Cherry. | 865. grandiflora, Hook. | N. & U. P. |
| | "Clearings." First collected in L. P., near Farwell, in June, 1876, where it seemed to be at home. Near the mouth of the Au Sable river, Iosco Co., June, '78.—C. B. Cochran. "S. shore of L. Superior."—Gray, Synopt. Fl. N. A. | |
| Ground Cherry. | 866. Philadelphica, Lam. | |
| | Grand Rapids—Coleman Cat. | |
| Ground Cherry. | 867. Virginiana, Mill. (***) | Th. |
| | Light, sandy soil. | Common. |
| Ground Cherry. | 868. lanceolata, Michx. | C. & S. |
| | Sandy soil. Ionia Co. (!), etc. | Frequent. |

- Ground Cherry. 869. *pubescens*, L. (***) C. & S.
Common throughout the pine country. Ann Arbor—Winch. Cat.; Mont-
calm Co., etc.

NICANDRA

- Apple of Peru. 870. *physaloides*, Gærtn. (***)
Gardens. Ann Arbor—Winch. Cat.; Flint; Ionia Co. (!) Scarce.

LYCIUM

- Matrimony Vine. 871. *vulgare*, Dunal. (***)
Escaped from gardens in some places.

HYOSCYAMUS

- Henbane. 872. *niger*, L. (*)
Macomb Co.; Ft. Gratiot; Mackinac, abundant—Winch. Cat.

DATURA

- Common Stramonium, or Thornapple. 873. *Stramonium*, L. (*) C. & S.
Roadsides. Frequent.
Jamestown Weed. 874. *Tatula*, L. (***) C. & S.
Purple Thorn-apple. Flint; Macomb Co. Rare.
P. Stramonium.

NICOTIANA

- Wild Tobacco. 875. *rustica*, L. (***)
Emmet Co., cultivated by the Indians—Winch. Cat.

GENTIANACEÆ.

(Gentian Family.)

ERYTHRÆA

- Centaury. 876. *Centaureium*, Pers.
Lansing—Bailey. Adv. and rare.

SABBATIA

- American Centaury. 877. *angularis*, Pursh. S.
Marshes. Cass Co.—Univ. Herb., Houghton Survey Coll., 1833; Gognac
Lake, near Battle Creek, 1879—Prof. V. M. Spalding; S. Mich.—Wr.
Cat. Rare.

GENTIANA

- Fringed Gentian. Blue Gentian. 878. *crinita*, Frœl. Th.
Low grounds. Ann Arbor—Winch. Cat.; Lansing and So. Haven—Bailey;
Mackinac—Whitney; Ionia Co. (!), etc. Common.
Smaller Fringed Gentian. 879. *serrata*, Gunner. Th.
With the last. Frequent.
Five-flowered Gentian. 880. *quinqueflora*, Lam. (***) Th.
Moist hillsides. Ann Arbor—Winch. Cat.; Ionia Co. (!) Occasional.
Five-flowered Gentian. 881. *quinqueflora*, Lam., var. *occidentalis*, Gray.
Ann Arbor—Winch. Cat.
Blue Gentian. 882. *puberula*, Michx. (**) S.
Barrens. Ann Arbor—Miss Clark, Miss Allmendinger. Rare.
Soapwort Gentian. 883. *Saponaria*, L. (***) S.
Moist woods. Macomb Co.; S. Mich.—Wright Cat. Infrequent.
Closed Gentian. 884. *Andrewsii*, Griesb. (***) C. & S.
River banks. Frequent.

- Whitish Gen- 885. *alba*, Muhl. Th.
tian.
Low meadows and borders of woods. Ionia Co. (!); Clinton Co. (!); Ann Arbor and S. W.—Winch. Cat.; to L. Superior. Rare or local.
886. *linearis*, Fröel., var. *lanceolata*, Gr. N. & U. P.
Pt. au Chene, L. Mich.—Winch. Cat. "Minnesota and along L. Superior."
—Gray.

FRASERA

- American 887. *Carolinensis*, Walt. (**) C. & S.
Columbo.
Rich, dry soil. Jackson Co. and westward—Winch. Cat.; Ann Arbor—
Miss Clark; Grand Rapids (!); Macomb Co. Scarce.

HALENIA

- Spurred 888. *deflexa*, Griesb. N. & U. P.
Gentian.
Shore of Little Traverse Bay, near Harbor Point (!); Drummond's Is. and
St. Helen's Is.—Winch. Cat.; northward to L. Superior. Frequent.

BARTONIA

- Bartonia. 889. *tenella*, Muhl.
Screw-stem.
Open woods. S. Mich.—Wright Cat.; Hubbardston (!); Flint. Rare.

MENYANTHES

- Buckbean. 890. *trifoliata*, L. (**) Th.
Bogs. Common.

APOCYNACEÆ.

(Dog-bane Family.)

APOCYNUM

- Spreading 891. *androsæmifolium*, L. (**) Th.
Dogbane. Borders of woods. Common.
- Indian Hemp. 892. *cannabinum*, L. (**) Th.
Low grounds. Exceedingly variable in size, habit, shape of leaves, pu-
bescence, etc. De Candolle's varieties *glaberrimum* and *pubescens* occur,
but also intermediate forms, rendering useless any sub-specific names.
Common.

ASCLEPIADACEÆ.

(Milkweed Family.)

ASCLEPIAS

- Butterfly- 893. *tuberosa*, L. (**) Th.
weed. Sandy soil. Ranges from Canada to Florida, and from the Saskatchewan
Pleurisy-root. Valley to Texas. Occasionally cultivated for its showy orange-red
flowers. Roots exported. Common.
- Purple Milk- 894. *purpurascens*, L. C. & S.
weed. Woods. Ann Arbor.—Winch. Cat.; Ionia Co. (!); Clinton Co. (!); Flint; Ma-
comb Co. Frequent.
- Indian Hemp. 895. *incarnata*, L. (**) Th.
Swamp Milk- Banks of streams. Common.
- Milkweed. 896. *Cornuti*, Decaisne. (**) Th.
Silkweed. Fields. The young shoots eaten for greens. Common.
- Poke Milk- 897. *phytolaccoides*, Pursh. (***) C. & S.
weed. Moist grounds. Ann Arbor; Ft. Gratiot.—Winch. Cat.; Ionia Co. (!);
Lansing (!); Flint; Macomb Co. Infrequent.
- Four-leaved 898. *quadrifolia*, L. (?)
Milkweed. Ann Arbor.—Winch. Cat.
- Whorled 899. *verticillata*, L. (***) S.
Milkweed. Barrens. S. Mich.—Wright Cat. Infrequent.

ACERATES

Green Milk-weed.

900. *viridiflora*, Ell.

Ft. Gratiot.—Winch. Cat.; S. W.—Wright Cat.

C. & S.

Rare.

OLEACEÆ.

(*Olive Family.*)

FRAXINUS

White Ash.

901. *Americana*, L.

Th.

Not frequent enough N. and in U. P. to be of economic importance. Moist woods. A valuable timber tree of medium size, which on account of the toughness, elasticity, and beauty its wood is much used for cabinet making, wainscoting, carriage making, handles of scythes, rakes, etc., etc. Ought to be planted oftener for shade and ornament. Common.

Red Ash.

902. *pubescens*, Lam.

Th.

Low grounds. A small tree, seldom noticed. Ionia Co. (!); Lansing (!) S. Mich.—Wright Cat.; Drummond's L.—Winch. Cat. Scarce.

Green Ash.

903. *viridis*, Michx. f.

C. & S.

Ann Arbor.—Winch. Cat.

Rare.

Blue Ash.

904. *quadrangulata*, Michx.

Th.

Rich woods. "Large timber tree, the inner bark yielding a blue color to water."—Gray, Fl. N. A. This tree is frequently confounded with White Ash, from which it may easily be distinguished by its square branchlets. Wood valuable. Frequent.

Black Ash.

905. *sambucifolia*, Lam.

Th.

A common tree in swamps; less valuable than white ash. Wood used for hoops, basket work, etc. Also beginning to be used for inside finishing in houses—doors, cabinets, etc. Black ash doors with hard maple panels, finished in oil, are said to present a very pleasing appearance, and to be both inexpensive and durable. Common.

ARISTOLOCHIACEÆ.

(*Birthwort Family.*)

ARISTOLOCHIA

Virginia Snake-root.

906. *Serpentaria*, L. (?)

Said to occur in the S. part of the State.

ASARUM

Asarabacca.
Wild Ginger.
Coltsfoot.907. *Canadense*, L. (**)

Moist woods.

Th.

Common.

PHYTOLACCACEÆ.

(*Poke-weed Family.*)

PHYTOLACCA

Garget.
Poke. Scoke.
Pigeon Berry.908. *decandra*, L. (**)

Fields. The young shoots in spring may be eaten like asparagus.

C. & S.

Frequent.

CHENOPODIACEÆ.

(*Goosefoot Family.*)

CHENOPODIUM

Lamb's Quarters.
Pigweed.909. *album*, L.

Waste and cultivated ground.

Th.

Common.

Oak-leaved
Goosefoot.910. *glaucum*, L.

Lansing, College grounds.

911. *urbicum*, L., var. *rhombofolium*, Moquin. S.
Waste grounds. Ionia Co. (!); Flint; Grand Rapids—Coleman Cat.
Maple-leaved Goosefoot. Infrequent.
912. *hybridum*, L. Th.
Waste grounds. Common.
913. *murale*, L. Rare.
Grand Rapids—Coleman Cat.
914. *Botrys*, L. (***) C. & S.
Escaped from gardens. Abundant in places.
915. *ambrosioides*, L. (***) S.
Waste places. Macomb Co.; Ann Arbor—Miss Clark; S. W.—Wright Cat.
Scarce.

BLITUM

916. *capitatum*, L. Th.
Dry, rich grounds. Very noticeable from the fleshy, bright-red calyx.
Strawberry Blite. Common.
917. *Bonus Henricus*, Reich. Scarce.
Flint.

ATRIPLEX

918. *patula*, L., var. *hastata*, Gr.
Common at Detroit.—Dr. A. B. Lyons.

CORISPERMUM

919. *hyssopifolium*, L.
S. Haven—Bailey; and northward to L. Superior, along the shores of the Great Lakes.
Bug-seed.

AMARANTACEÆ.

(Amaranth Family.)

AMARANTHUS

920. *hypochondriacus*, L. (***)
Scarcely escaped from gardens. Ann Arbor—Miss Clark.
Prince's Feather. L. P.
921. *retroflexus*, L. Common.
A common weed in gardens.
922. *albus*, L. L. P.
Fields and gardens, less troublesome than the preceding species.
Pigweed. Red-root. Green Amaranth. Frequent.

ACNIDA

923. *tuberculata*, Moquin-Tandon. C. & S.
Low grounds. S. Mich.—Winch. Cat.; Ionia Co. (!); Lansing (!); Macomb Co. Frequent.

POLYGONACEÆ.

(Buckwheat Family.)

POLYGONUM

924. *viviparum*, L. (***) U. P.
Shore of L. Superior—Gray; Isle Royale, common.—Whitney Cat.
Alpine Bistort.
925. *orientale*, L.
Sparingly escaped from gardens.
Prince's Feather.
926. *Careyi*, Olney. (?)
Grand Rapids.—Coleman Cat.
927. *Pennsylvanicum*, L. C. & S.
Low grounds. Ionia Co. (!); Clinton Co. (!); Flint; S. Mich.—Wright Cat.
Frequent.

928. *incarnatum*, Ell. C. & S.
River banks. Ionia Co.(!); Grand Rapids—Coleman Cat. Frequent.
929. *lapathifolium*, Ait. U. P.
L. Superior—O. B. Wheeler.
- Lady's 930. *Persicaria*, L. (***) Th.
Thumb. Waste places. Common.
- Common 931. *Hydropiper*, L. (***) Th.
Smartweed, or Moist grounds. Common.
Water-pepper.
- Water 932. *acre*, HBK. (***) L. P.
Smart-weed. Wet places. Ann Arbor; Ionia Co.(!); Mackinac—Winch. Cat.; Flint. Frequent.
- Mild Water- 933. *hydropiperoides*, Michx. (***) C. & S.
pepper. Wet places. Common.
- Water 934. *amphibium*, L., var. *aquaticum*, Willd. Th.
Persicaria. Borders of ponds. Frequent.
- Water 935. *amphibium*, L., var. *terrestre*, Willd. C.
Persicaria. E. shore L. Huron.—J. Macoun; Ionia Co.(!); Flint; Grand Rapids.
936. *Hartwrightii*, Gray.
Kalamazoo—Tuthill.
937. *Virginianum*, L. C. & S.
Thickets. Common.
- Joint-weed. 938. *articulatum*, L. N. & U. P.
Traverse City—Winch. Cat.; L. Superior—Whitney Cat.
- Door-weed. 939. *aviculare*, L. (***) Th.
Knotgrass. The commonest of weeds.
- Goose-grass. 940. *erectum*, L. Common.
Erect knot- Waste places with the preceding species.
- grass. 941. *ramosissimum*, Michx. Th.
Banks of streams. Infrequent.
- Slender Knot- 942. *tenuis*, Michx. C. & S.
grass. Sterile soil. S. Mich.—Wright Cat.; common in Ionia Co.(!); Macomb Co.
- Halberd- 943. *arifolium*, L. L. P.
leaved Tear- Low grounds. South Haven—Bailey; Gros Cap, L. Mich.—Winch. Cat.; S. Infrequent.
thumb. Mich.—Wright Cat.
- Arrow-leaved 944. *sagittatum*, L. Th.
Tear-thumb. Low grounds. Frequent.
- Black Bind- 945. *Convolvulus*, L. C. & S.
weed. Waste grounds. S. W.—Wright Cat.; Flint; Macomb Co. Infrequent.
946. *cilinode*, Mx. Th.
Copses. S. Haven—Bailey; Lyons, and northward. Common.
- Climbing 947. *dumetorum*, L. Th.
False Buck- Moist thickets. Common.
wheat.

FAGOPYRUM

- Buckwheat. 948. *esculentum*, Moench.
Persistent in fields.

RUMEX

- Great Water 949. *orbiculatus*, Gray. Th.
dock. Wet places. S. Mich.—Winch. Cat.; Ionia Co.(!); Flint; Macomb Co.; and northward. Frequent.
- Pale Dock. 950. *Britannica*, L. (***) Rare.
Sault Ste. Marie.—Winch. Cat.; and southward.

White Dock.	951. <i>salicifolius</i> , Weinmann.	N. & U. P.
	Shore of Little Traverse Bay(!); and northward.	Scarce.
Swamp Dock.	952. <i>verticillatus</i> , L.	L. P.
	Wet swamps.	Frequent.
Curled Dock. Yellow D.	953. <i>crispus</i> , L. (**)	Th.
	Everywhere in fields. A bad weed.	
Bitter Dock.	954. <i>obtusifolius</i> , L. (***)	Th.
	Meadows and fields.	Frequent.
Bloody-veined Dock.	955. <i>sanguineus</i> , L. (***)	
	Ann Arbor—Miss Clark.	
Field or Sheep Sorrel.	956. <i>Acetosella</i> , L. (***)	Th.
	Sterile fields.	Common.

LAURACEÆ.

(Laurel Family.)

SASSAFRAS

Sassafras.	957. <i>officinale</i> , Nees. (*)	C. & S.
	Woods—sandy soil. A shrub or low tree, not found north of the C. of the State.	Frequent.

LINDERA

Spice-bush. Benjamin- bush.	958. <i>Benzoin</i> , Meisner. (***)	C. & S.
	Damp woods.	Frequent.

THYMELEACEÆ.

(Mezereum Family.)

DIRCA

Leather-wood. Moose-wood.	959. <i>palustris</i> , L. (***)	Th.
	Woods. The tough bark used for thongs by Indians. Ann Arbor—Winch. Cat.; S. Haven—Bailey; and northward.	Frequent.

ELÆAGNACEÆ.

(Oleaster Family.)

SHEPHERDIA

Canadian Shepherdia.	960. <i>Canadensis</i> , Nutt.	Th.
	Gravelly banks. Lansing—Prof. W. J. Beal; "On the western islands in Lake Erie."—Dr. D. Cooley; Ann Arbor—Winch. Cat.; South Haven—Bailey; Flint; and northward. Abundant at Petoskey(!). "A common short shrub," (L. Superior,)—Whitney Cat.	

SANTALACEÆ.

(Sandalwood Family.)

COMANDRA

Bastard Toad- flax.	961. <i>umbellata</i> , Nutt.	Th.
	Dry ground. Indifferently parasitic on roots.	Common.
	962. <i>livida</i> , Richards.	N. & U. P.
	"Sandy shores, L. Superior."—Gray; Traverse City—Dr. A. B. Lyons; Isle Royale—Whitney Cat.	

SAURURACEÆ.

(Lizard's-tail Family.)

SAURURUS

- Lizard's-tail. 963. *cernuus*, L. (***)
Swamps.

C. & S.
Common.

CERATOPHYLLACEÆ.

(Hornwort Family.)

CERATOPHYLLUM

- Hornwort. 964. *demersum*, L.
Ponds. Fruit in August.

Th.
Common.

CALLITRICHACEÆ.

(Water-Starwort Family.)

CALLITRICHE

- Water-Starwort. 965. *verna*, L. (***)
Ponds. Macomb Co., to Lake Superior.
- Water-Starwort. 966. *autumnalis*, L.
Rivers. Flint—Dr. Daniel Clark; to Lake Superior—Gray.

Th.

PODOSTEMACEÆ.

(River-weed Family.)

PODOSTEMON

- River-weed. 967. *ceratophyllus*, Michx.
Dr. A. B. Lyons.

EUPHORBIACEÆ.

(Spurge Family.)

EUPHORBIA

- Shore Spurge. 968. *polygonifolia*, L.
Sandy shores of the Great Lakes. S. Haven—Bailey; Ft. Gratiot—Winch. Cat., etc.
- Spotted Spurge. 969. *maculata*, L. (***)
Roadsides and fields, everywhere. One of the few northern plants, observed by Prof. A. N. Prentiss in Brazil.
970. *hypericifolia*, L. (***)
Cultivated soil, and waste places. Detroit—Dr. A. B. Lyons; Ionia (!); Grand Rapids (!); Lansing—Bailey.
- Flowering Spurge. 971. *corollata*, L. (**)
Sandy soil. A weed difficult to eradicate on account of its deep roots. Beginning to be cultivated by gardeners for its abundant, small, white flowers. Its milky juice is acrid-poisonous.
972. *platyphylla*, L.
Macomb Co.; "Along the Great Lakes."—Gray.
973. *Helioscopia*, L. (***)
Common at Detroit.—Dr. A. B. Lyons.
974. *commutata*, Engelm.
Ann Arbor.—Winch. Cat.; Flint.

Th.

Ft. Gratiot—
Frequent.

C. & S.

Infrequent.

C. & S.

- Garden 975. *Cyparissias*, L. (***)
 Spurge. Escaped from cultivation. Frequent.
 Door-yard S.
 976. *Esula*, L.
 Escaped from cultivation. Infrequent.

ACALYPHA

- Three-seeded 977. *Virginica*, L. Th.
 Mercury. Open woods. Variable. Ionia (!); Detroit (!), etc. Common.

EMPETRACEÆ.

(Crowberry Family.)

EMPETRUM

- Black Crow- 978. *nigrum*, L. U. P.
 berry. Whitney Cat.

URTICACEÆ.

(Nettle Family.)

ULMUS

- Slippery Elm. 979. *fulva*, Michx. (*) Th.
 Red Elm. Rich soil. Wood reddish, tough and hard. The inner bark mucilaginous and much used in medicinal preparations. Frequent.
 White Elm. 980. *Americana*, L. (***) Th.
 American Elm. Low grounds. Wood tough, fine grained, valuable, used for wagon hubs, etc. One of our finest ornamental trees. Common.
 Rock Elm. 981. *racemosa*, Thomas. Th.
 River banks. Wood similar to the last but more valuable; takes a fine polish. A large, fine tree, frequently planted. Frequent.

CELTIS

- Hackberry. 982. *occidentalis*, L. C. & S.
 Sugarberry. River banks. Sap wood, yellow, inner wood, grayish, coarse grained, soft and of little value, used for fuel. A medium or large sized tree. Frequent.
 Nettle-tree.

MORUS

- Red Mul- 983. *rubra*, L. (***) C. & S.
 berry. A small tree on river bottoms. Wood valuable. Wayne Co.; Ionia Co. (!); Lansing (!). The largest specimen observed grows near Ionia, and measures fourteen inches in diameter two feet above the ground. Frequent as far north as latitude 43°, where the abundant fruit ripens the last of June.

URTICA

- Tall Wild 984. *gracilis*, Ait. Th.
 Nettle. Moist ground. Common.
 Great Sting- 985. *dioica*, L. (***) Th.
 ing Nettle. Waste places. Occasional.

LAPORTEA

- Wood Nettle. 986. *Canadensis*, Gaud. (***) C. & S.
 Cursed Net- Thick woods along streams. A vicious weed. Common.
 tle.

PILEA

- Richweed. 987. *pumila*, Gray. C. & S.
 Low woods. Common.

BŒHMERIA

- False Nettle. 988. *cylindrica*, Willd. C. & S.
 Moist ground. Common.

PARIETARIA

- Pellitory. 989. *Pennsylvanica*, Muhl.
Grand Rapids—Coleman's Cat.

CANNABIS

- Hemp. 990. *sativa*, L. (*) L. P.
Waste places. Frequent.

HUMULUS

- Common Hop. 991. *Lupulus*, L. (*) Th.
Banks of streams. Frequent northward.

PLATANACEÆ.

(Plane-tree Family.)

PLATANUS

- Plane-tree. 992. *occidentalis*, L. C. & S.
Buttonwood. Along our rivers. "The largest tree of the Atlantic forests"—Sargent.
Presents a striking appearance by reason of its mottled bark, which is
rarely more than one-sixteenth of an inch thick. Wood reddish, tough,
and unweedgeable; can be used in short sections for cabinet work, sew-
ing machines, tables, etc., but is very liable to warp. Frequent.

JUGLANDACEÆ.

(Walnut Family.)

JUGLANS

- Butternut. 993. *cinerea*, L. (*) C. & S.
Low, rich woods. A medium-sized tree, often planted. The wood is lighter
and softer than the next, but takes a fine polish—used in cabinet making
and in houses in inside finishing. Recommended, in connection with
lighter woods, for wainscotings, mouldings, etc., where black walnut
would have too glaring and pronounced an appearance; makes good
doors—not liable to warp. Common.
- Black Walnut. 994. *nigra*, L. (***) C. & S.
One of our most valuable timber-trees, and more used in cabinet-making
than any other. At its present rate of consumption, the black walnut
in Michigan will soon be a thing of the past. Frequent.

CARYA

- Shag-bark 995. *alba*, Nutt. (***) C. & S.
Hickory. Timber very valuable; used wherever great durability, strength, and
elasticity are required. *C. microcarpa*, Nutt., occurs and seems to be
distinct. Common.
- Western Shell- 996. *sulcata*, Nutt. C. & S.
bark Hickory. River bottoms. Ionia Co.(?), where it reaches its northern limits. Rare.
except in the extreme south.
- Mocker-nut. 997. *tomentosa*, Nutt. C. & S.
Dry woods. Flint; Grand Rapids—Coleman's Cat. Rare.
- Pignut. 998. *porcina*, Nutt. C. & S.
Woods. Nuts pear-shaped or oblong. Common.
- Bitternut. 999. *amara*, Nutt. C. & S.
Moist soil. No member of this family gets much north of lat. 43°. Common.

CUPULIFERÆ.

(Oak Family.)

QUERCUS

- | | | |
|----------------------------------|--|---------|
| White Oak. | 1000. <i>alba</i> , L. (*) | Th. |
| | Rich woods. Rare in U. P., Menominee Co.—Burt MS. Cat.; etc. Our most valuable species. Much used in inside finishing, carriage-making, etc., etc., wherever a strong, durable, and beautiful timber is desired.
Common. | |
| Bar Oak. | 1001. <i>macrocarpa</i> , Michx. (***) | C. & S. |
| | Rich soil.
Common. | |
| Swamp White Oak. | 1002. <i>bicolor</i> , Willd. | C. & S. |
| | Low ground. A large tree. Scales of the involucre often bear galls which resemble abortive acorns.
Common. | |
| Yellow Chestnut Oak. | 1003. <i>Muhlenbergii</i> , Engelm. | C. & S. |
| | Rich woods. A medium sized tree.
Common. | |
| Dwarf Chestnut Oak. | 1004. <i>prinoides</i> , Willd. | C. & S. |
| | A low shrub or small tree. Macomb Co.; Hubbardston (!); Muir (!); Gratiot Co. (!). This and the preceding seem to run together.
Infrequent. | |
| Laurel or Shingle Oak. | 1005. <i>imbricaria</i> , Michx. | S. |
| | Barrens. Galesburg—H. Dale Adams; Ann Arbor—Winch. Cat.; S. Mich.—Dr. Wright.
Rare. | |
| Black Jack Oak. | 1006. <i>nigra</i> , L. (?) | |
| | Said to occur in the extreme S. W. | |
| Scarlet Oak. | 1007. <i>coccinea</i> , Wang. | Th. |
| | Inner bark reddish; scales of involucre, brown, glabrate, appressed. In the C. this species blossoms and puts forth its leaves about two weeks earlier than the next, and the leaves are smooth and glossy before the leaves of the next have become well divested of their reddish down.
Frequent. | |
| Black Oak.
Yellow-barked Oak. | 1008. <i>tinctoria</i> , Bartram. (*) | |
| | Inner bark bright yellow; scales of involucre yellowish-canescant, somewhat squarrose; leaves less pinnatifid, more obovate in outline and less glossy-green than those of <i>Q. coccinea</i> . This species and the preceding occur together in the C. and are seldom large—usually 40-50 ft., and 12-15 inches in diameter. Considerable study has shown no gradations between the two forms, except one anomalous specimen, with very long acorns, and some characteristics of both species. | |
| Red Oak. | 1009. <i>rubra</i> , L. (***) | Th. |
| | Wood reddish, coarse; used chiefly for fence rails and fuel. In the C. & S., a large tree; in the N. either a very large tree, (Emmet Co.—Winchell), or, at Petoskey, a low tree or tall shrub (!); in U. P., along the shore, a low shrub or scraggy tree (the common form), or, in Ontonagon valley, a good-sized tree—Whitney. <i>Q. ambigua</i> , Mx., apparently belongs here.—(See Engelm. "Oaks of the U. S." Tr. Ac. Sc., St. Louis, Vol. III.) "One of the most variable of the Atlantic species."—Engelmann. | |

CASTANEA

- | | | |
|-----------|--|-------|
| Chestnut. | 1010. <i>vulgaris</i> , var. <i>Americana</i> , A. DC. (***) | S. E. |
| | Occurs rarely in the S. E. Does well when planted, at least as far north as lat. 44°; Macomb Co.; Wayne Co.; Monroe Co.; Ann Arbor—Dr. Steere. | |

FAGUS

- | | | |
|--------|---|-----|
| Beech. | 1011. <i>ferruginea</i> , Ait. | Th. |
| | Common in L. P., but rare in U. P. Occurs at Mackinac and Pictured Rocks. | |

CORYLUS

- | | | |
|-----------------|--------------------------------------|-----|
| Wild Hazel-nut. | 1012. <i>Americana</i> , Walt. (***) | Th. |
| | Thickets.
Common. | |

- Beaked Hazel. 1013. *rostrata*, Ait. (***)
Lansing—Bailey, probably its southern limit; Hubbardston(!); and common northward.

OSTRYA

- Hop-Hornbeam. 1014. *Virginica*, Willd. Th.
Iron-wood. Rich woods. Common.

CARPINUS

- Blue or Water Beech. 1015. *Americana*, Michx. Th. (?)
Along streams. Wood of this and the preceding tough and durable; used for wedges, levers, etc. Common.

MYRICACEÆ.

(Sweet Gale Family.)

MYRICA

- Sweet Gale. 1016. *Gale*, L. (***) N. & U. P.
Swamp near Crooked Lake, Emmet Co.(!); Manistee—E. J. Hill; Isle Royale—Dr. A. B. Lyons.
Bay-berry. 1017. *cerifera*, L. (***)
Wax-Myrtle. S. Mich.—Winch. Cat.

COMPTONIA

- Sweet Fern. 1018. *asplenifolia*, Ait. (***) Th.
South—Wr. Cat.; Detroit—Dr. A. B. Lyons. Very common in the center of the State and northward throughout the pine country, of which it is a characteristic species.

BETULACEÆ.

(Birch Family.)

BETULA

- Cherry Birch. 1019. *lenta*, L. (***) Th.
Ann Arbor—Allmend. Cat.; S. Haven—Bailey; near Lansing—Prof. W. J. Beal; Hubbardston(!); Flint; and northward to L. Superior. Rare in the south, but attains a "monstrous size" on Drummond's I.—Winch. Cat.
Yellow Birch. 1020. *lutea*, Michx. f. Th.
Ann Arbor—Winch. Cat.; S. Haven—Bailey; to L. Superior. "Common along the line of the F. & P. M. R. R., and northward to the Traverse country; a large tree; timber valuable."—Prof. W. J. Beal. Rare south of the Grand-Saginaw valley.
Paper Birch. 1021. *papyracea*, Ait. (***) Th.
Canoe Birch. Extends southward to Lansing and perhaps further. Frequent at Crystal Lake, Montcalm Co.(!) as a small tree. Often springs up, forming a dense thicket, where pine lands have been burned over. Bark separating into thin, papery strips, used by Indians for canoes, basket-work, etc. A large tree at the north.
Silver Birch.
Low Birch. 1022. *pumila*, L. Th.
Swamps. Frequent.
1023. *glandulosa*, Michx. U. P.
Burt's MS. Cat.

ALNUS

- Green or Mountain Alder. 1024. *viridis*, DC. U. P.
"Dry rocky land"—Whitney Cat.; Isle Royale—Dr. A. B. Lyons. Common.
Speckled or Hoary Alder. 1025. *incana*, Willd. (***) Th.
Tag-Alder. Borders of streams. The prevailing Alder in center of the State and in U. P. Common.

- Smooth Alder. 1026. *serrulata*, Ait. (***) Th.
 Macomb Co.; Traverse City and S. Mich.—Winch. Cat.; Burt. MS. Cat.
 Rare or local.

SALICACEÆ.

(Willow Family.)

Rarer sp. determined by M. S. Bebb, of Fountaindale, Illinois.

SALIX

- Hoary Willow. 1027. *candida*, Willd. Th.
 Usually in Tamarack swamps. Rare in S. part of the State. Com.
- Prairie Willow. 1028. *humilis*, Marshall. Th.
 Not reported south of Lansing. Common along the line of D. M. & G. H. R. R.; Ionia Co. (!); and northward to Marquette Co.—Burt MS. Cat.
- Glaucous Willow. 1029. *discolor*, Muhl. (***) Th.
 River banks. This species and the preceding are much visited by bees in early spring for pollen and honey. Common.
- Silky-leaved Willow. 1030. *sericea*, Marshall.
 Drummonds' Is.—Winch. Cat.; Ionia Co. (!); and southward to S. Haven—Bailey. Very common in central part of the State.
- Petioled Willow. 1031. *petiolaris*, Smith. Th.
 With the last. From Sault Ste. Marie southward. Ionia Co. (!); Lansing—Bailey. Frequent.
- Basket Osier. 1032. *viminialis* L.
 Woodard Lake, Ionia Co. (!); S. Haven,—Bailey.
- Heart-leaved Willow. 1033. *cordata*, Muhl. Th.
 Along streams. Narrow-leaved forms occur in the central and southern parts of the State; at Petoskey (!), broadly ovate-heart-shaped leaved forms occur. Common.
- Glaucous Willow. 1034. *glaucophylla*, M. S. Bebb, *sp. nov. ined.*

Hubbardston (!); Petoskey (!); frequent along the shores of Little Traverse Bay (!). Has been confounded with *S. Barclayi*, Anders. (See Bot. Gaz., March, 1878.)

The following notes and description of this interesting species and its varieties have been furnished by Mr. Bebb, who is preparing a Monograph on the *Salicaceæ*:

"*S. glaucophylla*, n. sp. Leaves broadly ovate or elliptical lanceolate, rounded or narrowed at base, apex more or less cuspidate acuminate, coriaceous in texture, glabrous, dark green above except the yellowish midrib, intensely glaucous and obscurely reticulate veined beneath, the young drying black, margin sharply serrate with glandular indented serratures, petioles short downy, stipules ovate, serrate; aments with leaf-like bracts at base, thick, cylindrical, densely flowered appearing with the leaves, when in flower about one inch long; the fertile when mature sometimes very large, 3 inches long, $\frac{3}{4}$ in. thick; capsules elongated-conical from an ovate base 3-5 lines long, glabrous, greenish, turning brown in drying; pedicels 4-5 times the length of the nectary, concealed by the copious long white hairs with which the scales are clothed; style produced; stigmas short thick, entire or 2-lobed.

"*Var. latifolia*. Leaves crowded, broadly ovate-lanceolate, rounded or sub-cordate at base, 3-4 inches long, nearly 2 inches wide, stipules conspicuous, reniform. Chicago, *Babcock*, exsicc. No. 3, 4, 13, 15, 47; Madison, Wisconsin, *S. H. Watson*, in Herb. Canby. Fountaindale (!).

"*Var. angustifolia*. Leaves lanceolate cuspidate, narrowed at base, 3 in. long, $\frac{3}{4}$ in. wide; stipules small, often wanting; aments elongated-cylindrical. Chicago, *Babcock*, exsicc. 14, 28, 45, 23, 8.

"*Var. brevifolia*. Leaves obovate, acute, wedge-shaped at base, $1\frac{1}{2}$ inches long, 5-6 lines wide, prominently reticulate veined; stipules none. Leaves strikingly like those of *S. arbuscula*. Sand dunes, Little Traverse Bay, Mich. July 30, '79. *C. F. Wheeler*.

"Ten years ago I was inclined to regard this as a robust variety, of *S. cordata*, but in a constantly increasing accession of specimens, from the most luxuriant growth down to the starveling of the arid sand dunes of Lake Michigan, it was always clearly recognizable as something distinct from *S. cordata*. I next tried to find a place for it under *S. Barclayi* Anders., being misled by the author's assertion that *S. Barclayi* was very nearly related to *S. cordata*, of which it might be regarded as a "*quasi modificatio occidentalis robustior*," with "shorter and broader leaves" "turning black," etc.; misled, also, by the figure in the *Monographia Salicium*, which, whatever it may represent, was certainly not

drawn from the type specimen of *S. Barclayi*. This (*S. Barclayi*) was published as a new species in the author's preliminary Synopsis of N. A. Willows, 1858, based wholly upon a single specimen (in Herb. Hook.) from Kodiak, *Barclay*, and on p. 31, l. c. it was arranged in a group of American species, "manifestly representing European types" as "belonging to the type of *S. glauca*."

"It answers my present purpose to show that *S. glaucophylla*, n. sp. differs widely from the typical *S. Barclayi* in its smooth capsules, longer pedicels, shorter style, and very different stigmas. It also differs from *S. cordata* in the leaves proportionately shorter and broader with somewhat the texture of *S. lucida*, the young drying black, more glaucous beneath, especially when old; aments thicker and more densely hirsute (much as in *S. discolor*); capsules very much larger and drying brown. As indigenous at Fountindale, this is a straggling shrub, about 6 feet high, the young twigs glabrous and bright yellow, stained with crimson where exposed to much sunlight. Some of the plants in the *Salicetum* however, are more erect, 8 feet high, brownish twigs, puberulent, and the whole habit that of *S. discolor*."

1035. *balsamifera*, Barrett.

Only found at Flint, by Dr. D. Clark. Station since destroyed,

Tomentous Willow.

1036. *adenophylla*, Hook.

Leaves ovate, ovate-lanceolate, cordate, glandular-serrate, densely tomentose. On old stems the leaves are ovate-lanceolate and *densely tomentose all over*, while on young shoots they are broadly ovate, cordate, and sometimes smooth late in the season. Low, 2-5 feet. Beach sand, Lake Michigan, Illinois, and northwestward. Petoskey (!); St. Jo., Dr. Wright in Torr. Herb.—Bebb. Hooker's original specimens came from Labrador. "Well marked by the copious, long, narrow serratures to the leaves tipped with a gland, so that the leaf looks as if it were fringed with pedicellate glands. These leaves are an inch or more long, clothed, even when fully grown, with long silky tomentum on both sides, etc."—Part of Hooker's original description of specimen in Harvard Herb.

Livid Willow.

1037. *rostrata*, Richardson.

Moist or dry ground.

Th.

Shining Willow.

1038. *lucida*, Muhl.

Along streams.

Com.

Th.

Common.

Black Willow.

1039. *nigra*, Marshall. (***)

Along streams; a small tree.

Th.

1040. *amygdaloides*, Anders.

Flint,—Dr. Clark.

White Willow.

1041. *alba*, L., var. *vitellina*, Carey.

Naturalized from Europe.

Brittle W.

1042. *fragilis*, L., var. *Russelliana*, Carey.

Coleman Cat.; Palmer Cat.

Long-leaved Willow.

1043. *longifolia*, Muhl.

Wet places.

Th.

Common.

Myrtle Willow.

1044. *myrtilloides*, L.

Sphagnous swamps. S. E.—Winch. Cat. Ionia (!); etc., to L. Superior. Frequent.

POPULUS

Poplar. American Aspen.

1045. *tremuloides*, Michx. (***)

Woods and lake shores, most abundant in U. P.—Whitney. Common.

Th.

Large-toothed Aspen.

1046. *grandidentata*, Michx.

Woods. Common northward, but "rare in U. P."—Whitney Cat. This tree and the last are being ground into pulp for making paper.

Th.

Cotton-wood. Necklace Poplar.

1047. *monilifera*, Ait.

Often a large tree, three feet in diameter. Not observed north of Crystal Lake, Montcalm Co. (!)

C. & S.

Balsam Poplar.

1048. *balsamifera*, L. (***)

River banks. A small tree in Michigan, often mistaken for the next.

Th.

Balm of Gilead.

1049. *balsamifera*, L., var. *candicans*, Gray. (***)

Not common, either wild or in cultivation, but certainly indigenous. S. Haven—Bailey; Flint; Sanford, Midland Co.—Prof. W. J. Beal; Elk Rapids—Winch. Cat.

Lombardy
Poplar.

- 1050.
- dilatata*
- , Ait.
-
- Common in cultivation.

L. P.

TAXACEÆ.

(Yew Family.)

TAXUS

American
Yew.
Ground Hem-
lock.

- 1051.
- baccata*
- , L., var.
- Canadensis*
- , Gray. (***)

Moist woods in the shade of evergreens. Along the east shore of Lake Michigan as far south as S. Haven.—Bailey; Grand Ledge.—Beal; Macomb Co., where it is rarely found. Common north of the center of the State(!).

CONIFERÆ.

(Pine Family.)

JUNIPERUS

Red Cedar.
Savin.

- 1052.
- Virginiana*
- , L. (**)

Th.

Bluffs and sterile soil.

Throughout, but scarce.

Juniper.

- 1053.
- communis*
- , L. (*)

Frequent throughout, along the highest grounds.

Savin.

- 1054.
- Sabina*
- , L., var.
- procumbens*
- , Ph. (*) N. & U. P.

Abundant, trailing over low sand dunes at the head of Little Traverse Bay (!); Old Mission,—Prof. W. J. Beal, etc.

THUJA

Arbor-vitæ.
White Cedar.

- 1055.
- occidentalis*
- , L. (***)

Th.

Very common northward. Timber very durable, much used for fence posts, etc.

ABIES

Balsam Fir.

- 1056.
- balsamea*
- , Marshall. (*)

C. N. & U. P.

Frequent in the northern part of Clare Co. (!); abundant at Petoskey (!); and northward.

TSUGA

Hemlock.

- 1057.
- Canadensis*
- , Carrière. (*)

Th. except S. E.

Rarely seen south of latitude 43° except west, and scarce on the Huron shore, but common on the east shore of L. Michigan, and from the central part of the State northward. Very abundant and of great size in Emmet Co.(!). Bark an article of commerce, used for tanning.

PICEA

White Spruce.

- 1058.
- alba*
- , Link.

N. & U. P.

From Ludington,—Prof. Beal; to Petoskey (!); and northward. Common.

Black Spruce.

- 1059.
- nigra*
- , Link. (***)

Th.

Frequent northward, and occasional south of lat. 43°,—a small tree in sphagnum swamps. The preceding species is more common northward.

LARIX

American
Larch.
Tamarack.

- 1060.
- Americana*
- , Michx. (***)

Th.

Swamps. A slender tree southward, but sometimes reaching 100 feet in height northward, where it is abundant.

PINUS

Scrub Pine.
Gray Pine.1061. *Banksiana*, Lambert.

In the western part of the State, noticed as far south as Newaygo Co.(!); "Sand Pt., Saginaw Bay, and northward along the shore of L. Huron, not common."—Winch. Cat. In the Central part of the State this pine is first seen in the northern part of Clare Co.(!), where it is common in groves on sandy barrens. In the S. E. township of Missaukee Co., along the west bank of the Muskegon river, occurs a barren terrace, about five miles long by two wide, which is covered with groves of this pine in all stages of growth from seedlings to fine shapely trees 50 to 60 feet in height, and 12 to 14 inches in diameter. The groves were not dense, but orchard-like, and disposed without regularity. There was little undergrowth except occasionally a few sand-cherries, stunted service bushes, and the rare alpine, three-toothed cinquefoil. The ground was barely carpeted with tufts of panic grass (*P. depauperatum*, L.), bird-foot violet, and bear berry.

Red Pine.
Norway Pine.1062. *resinosa*, Ait.

Dry woods. First noticed in Isabella Co., in center of the L. P.; very abundant in Clare Co.(!), and northward. "Frequent on low, sandy plains in U. P., where it forms orchard-like groves."—Whitney. Usually 100-110 feet high.

White Pine.

1063. *Strobus*, L.

Th.

Ranges from at least Mason, Ingham Co., in the center of the State, northward. Follows the shore of L. Michigan to the Indiana line. Usually 3 to 4 feet in diameter and 100 feet high, but often larger. Furnishes the pine lumber of commerce. The tallest white pine *we have measured* was 134 feet, and the largest diameter, scant 6 feet. Much taller and larger specimens are reported by lumbermen. The annual production of pine lumber in Michigan for the last decade has exceeded 2,000,000,000 feet. Yet, in spite of this enormous consumption, it is safe to say that Michigan still contains more valuable pine than any like area in North America. The lumber interest alone enriches the State something like \$40,000,000 a year.

ARACEÆ.

(Arum Family.)

ARISÆMA

Indian Turnip.
Jack-in-the-
Pulpit.1064. *triphyllum*, Torr. (***)

Th.

Rich woods.

Green Dragon.
Dragon Root.1065. *Dracontium*, Schott. (***)

C. & S.

Low grounds.

Infrequent.

PELTANDRA

Arrow Arum.

1066. *Virginica*, Raf.

C. & S.

S. Mich.—Wright Cat.; Huron River—Allmendinger Cat.; Ionia Co.(!); Flint.

CALLA

Water Arum.

1067. *palustris*, L.

Th.

Bogs.

Frequent.

SYMPLOCARPUS

Skunk Cab-
bage.1068. *fœtidus*, Salisb. (**)

Th.

ACORUS

Sweet Flag.

1069. *Calamus*, L. (**)

Th.

Margin of streams.

Infrequent.

LEMNACEÆ.

(Duck-weed Family.)

LEMNA

Duckweed.
Duck's-meat.1070. *trislca*, L.

C. & S.

Ponds.

Common.

Duck's-meat.	1071. minor, L.	C. & S.
	Ponds. Blossoms freely in June.	Common.
Duck's-meat.	1072. perpusilla, Torr.	C. & S.
	Ponds. Dr. A. B. Lyons.	
Duck's-meat.	1073. polyrrhiza, L.	C. & S.
	Ponds.	Common.

WOLFFIA

1074. Columbiana, Karsten.
Abundant on Maple River, Clinton Co.(!); Ionia Co.(!); Detroit—J. M. Bigelow.
1075. Brasiliensis, Weddell.
With the last. Nearly covering the surface of ponds and slow streams in July.

TYPHACEÆ.

(Cat-tail Family.)

TYPHA

Common Cat-tail.	1076. latifolia, L.	Th.
	Borders of streams.	Common.
Small Cat-tail.	1077. angustifolia, L.	
	Detroit—Dr. A. B. Lyons.	

SPARGANIUM

Bur-reed.	1078. eurycarpum, Engelm.	C. & S.
	Borders of ponds.	Frequent.
Bur-reed.	1079. simplex, Hudson., var. Nuttallii, Gr.	
	Fruitport—E. J. Hill.	
Bur-reed.	1080. simplex, Hud., var. androcladum, Gr.	C. & S.
	Ann Arbor—Allmendinger Cat.; Macomb Co.	
Bur-reed.	1081. simplex, Hud., var. angustifolium, Gr.	U. P.
	Isle Royale—Whitney Cat.	
Bur-reed.	1082. heterophylla, var. rigida, Engelm.	
	Fruitport—E. J. Hill.	
Bur-reed.	1083. minimum, Bauhin.	
	Hubbardston(!); Manistee—E. J. Hill.	Rare.

NAIADACEÆ.

(Pond-weed Family.)

NAIS

Naiad.	1084. major, All.	
	Flint—Dr. D. Clark.	
Naiad.	1085. flexilis, Rostk.	Th.
	Ponds.	Frequent.

ZANNICHELLIA

Horned Pond-weed.	1086. palustris, L.	
	Dr. A. B. Lyons.	

POTAMOGETON

Pond-weed.	1087. natans, L.	Th.
	Ponds.	Frequent.

- Pond-weed. 1088. *Claytonii*, Tuckerman.
Ionia Co. (!); Macomb Co.—Dr. D. Cooley; Fruitport—E. J. Hill.
- Pond-weed. 1089. *lateralis*, Morong.
Bear Lake, Van Buren Co.—E. J. Hill.
- Pond-weed. 1090. *Spirillus*, Tuckerman. U. P.
"Lake Superior"—Gray's Manual.
- Pond-weed. 1091. *hybridus*, Michx.
Dr. A. B. Lyons.
- Pond-weed. 1092. *rufescens*, Schrader. Th.
Mud Lake and Bear River, Petoskey—E. J. Hill.
- Pond-weed. 1093. *lonchites*, Tuckerman. C. & S.
Hubbardston (!); Macomb Co. Infrequent.
- Pond-weed. 1094. *amplifolius*, Tuckerman. L. P.
Maple River (!); Macomb Co.; Pere Marquette River at Ludington—E. J. Hill.
- Pond-weed. 1095. *gramineus*, L., var. *graminifolius*, Fries.
Bear Lake, Van Buren Co.—E. J. Hill.
- Pond-weed. 1096. *gramineus*, L., var. *heterophyllus*, Fries. Th.
Woodard Lake, Ionia Co. (!); Flint; Macomb Co.; and northward.
- Pond-weed. 1097. *lucens*, L.
Muskegon River, near Houghton Lake (!); Flint; S. Mich.—Wright Cat.
- Pond-weed. 1098. *zizii*, Schum.
Crystal Lake, near Frankfort, and Bear Lake, Manistee Co.—E. J. Hill;
Crystal Lake, Montcalm Co. (!); and Woodard Lake, Ionia Co. (!).
- Pond-weed. 1099. *prælongus*, Wulfen. Th.
Maple River (!), etc. Common.
- Pond-weed. 1100. *perfoliatus*, L. Th.
Maple River (!), etc. Common.
- Pond-weed. 1101. *perfoliatus*, L., var. *lanceolatus*, Robbins.
Little Traverse Bay, etc.; "Along the Great Lakes"—Gray.
- Pond-weed. 1102. *zosteræfolius*, Sch. Th.
Maple River and its tributaries (!), etc. Common.
- Pond-weed. 1103. *obtusifolius*, Mertens & Koch.
"Floating in Gratiot Lake, N. Mich."—Gray's Manual.
- Pond-weed. 1104. *pauciflorus*, Pursh. Th.
Hubbardston (!); Grand Rapids (!); Flint; Macomb Co.; and northward.
- Pond-weed. 1105. *pusillus*, L.
Manistee Lake—E. J. Hill.
- Pond-weed. 1106. *pusillus*, L., var. *major*, Fries.
Crooked River, Cheboygan Co., and common at Manistee and Frankfort—
E. J. Hill.
- Pond-weed. 1107. *pectinatus*, L. Th.
Fish Creek, Hubbardston (!). Frequent.
- Pond-weed. 1108. *marinus*, L.
Crystal Lake, near Frankfort, Benzie Co.—E. J. Hill. Rarer species de-
termined by E. J. Hill, of Engelwood, Illinois, whose knowledge of this
difficult genus is well known.

ALISMACEÆ.

(Water-Plantain Family.)

TRIGLOCHIN

- Arrow-grass. 1109. *palustre*, L. Th.
Marshes. Frequent.

- Arrow-grass. 1110. *maritimum*, L.
Macomb Co.; S. Mich.—Wright Cat.; Petoskey (!).
- Arrow-grass. 1111. *maritimum*, L., var. *elatum*, Gr. Th.
Ann Arbor,—Allmendinger Cat.; Flint; Macomb Co.; and northward.

SCHEUCHZERIA

- Scheuchzeria. 1112. *palustris*, L.
S. W.—Wright Cat.; Macomb Co.; Hubbardston (!); Montcalm Co. (!).
Frequent northward in cold bogs.

ALISMA

- Water Plantain. 1113. *Plantago*, L., var. *Americanum*, Gr. (***) Th.
Shallow water. Common.

ECHINODORUS

1114. *parvulus*, Engelm.
Dr. A. B. Lyons.

SAGITTARIA

- Arrow-head. 1115. *variabilis*, Engelm. Th.
Wet places. Occurs in many forms. Common.
- Arrow-head. 1116. *heterophylla*, Ph. Th.
Elk Rapids,—Winch. Cat., etc.
- Arrow-head. 1117. *heterophylla*, Ph., var. *rigida*, Engelm.
Fruitport,—E. J. Hill.
1118. *graminea*, Michx. S.
Dr. A. B. Lyons.

HYDROCHARIDACEÆ.

(*Frog's-bit Family.*)

ANACHARIS

- Water-weed. 1119. *Canadensis*, Planchon. Th.
Slow streams. Common.

VALLISNERIA

- Tape-grass. 1120. *spiralis*, L. L. P.
Eel-grass. Ann Arbor—Winch. Cat.; S. Haven,—Bailey; Hubbardston (!); to Petoskey (!). Slow streams. Common in Grand River and tributaries.

ORCHIDACEÆ.

(*Orchis Family.*)

ORCHIS

- Showy Orchis. 1121. *spectabilis*, L. C. & S.
Rich woods. Widely distributed. Scarce.
1122. *rotundifolia*, Ph. (?)
Flint—Dr. D. Clark; "Shore of L. Mich. in Wis."—Foote.

HABENARIA

- Naked-gland Orchis. 1123. *tridentata*, Hook. Th.
S. W.—Wright Cat.; Ann Arbor—Allmend. Cat.; Hubbardston (!); and northward.
- Greenish Orchis. 1124. *virescens*, Spreng. C. & S.
Macomb Co.; Ann Arbor,—Winch. Cat.; S. W.—Wright Cat.
- Bracted Green Orchis. 1125. *viridis*, R. Br., var. *bracteata*, Reich. Th.
Ann Arbor and Emmet Co.—Winch. Cat.; Macomb Co.; Kalamazoo; Hubbardston (!); Flint; Lansing—Bailey.

- Northern Green Orchis. 1126. *hyperborea*, R. Br. Th.
Wet woods. Common.
- Northern White Orchis. 1127. *dilatata*, Gr. Th.
S. E.—Winch. Cat.; Flint; Macomb Co.; and northward.
1128. *obtusata*, Richardson. U. P.
Isle Royale—Dr. A. B. Lyons; L. Sup., common—Whitney Cat.; Cove I.
L. Huron—Austin.
- Smaller Two-leaved Orchis. 1129. *Hookeri*, Torr. Th.
S. E.—Winch. Cat.; Hubbardston (!); Flint; Lake Superior—Whitney Cat.
- Large Round-leaved Orchis. 1130. *orbiculata*, Torr. Th.
Frequent in the pine region, not rare on U. P.—Whitney Cat.; Lansing—Bailey; Hubbardston (!); Flint, etc.
- Yellow Fringed-Orchis. 1131. *ciliaris*, R. Br. S. E.
Ann Arbor—Winch. Cat.; Macomb Co. Rare.
- White Fringed-Orchis. 1132. *blephariglottis*, Hook. C. & S.
S. Mich.—Winch. Cat.; Stanton (!). Rare.
- Western Orchis. 1133. *leucophæa*, Gray.
Ann Arbor—Winch. Cat.; Woodard Lake, Ionia Co. (!); Macomb Co. Rare.
- Ragged Orchis. 1134. *lacera*, R. Br. C. & S.
Ann Arbor—Winch. Cat.; Woodard Lake (!); Flint; Macomb Co.; Lansing—Bailey. Infrequent.
- Small Purple Fringed-Orchis. 1135. *psycodes*, Gray. Th.
Low grounds. Frequent.
- Large Purple Fringed-Orchis. 1136. *fimbriata*, R. Br.
Ann Arbor—Winch. Cat.; Macomb Co. Infrequent.

GOODYERA

- Rattlesnake Plantain. 1137. *repens*, R. Br. Th.
Bangor, Van Buren Co.—Bailey; Grand Rapids—Coleman Cat.; Roscommon Co.—Dr. Cooley; Petoskey (!); and northward. Infrequent.
- Rattlesnake Plantain. 1138. *pubescens*, R. Br. Th.
Woods. Common.
- Rattlesnake Plantain. 1139. *Menziesii*, Lindl. N. & U. P.
Boyne Falls, Northport, and Frankfort—E. J. Hill; Petoskey (!); Isle Royale and Traverse Bay—Dr. A. B. Lyons.

SPIRANTHES

- Ladies' Tresses. 1140. *latifolia*, Torr. Th.
Drummond's I., common, and S. E.—Winch. Cat.; Hubbardston (!); Flint. Rare in L. P.
- Ladies' Tresses. 1141. *Romanzoviana*, Chamisso. N. & U. P.
Borders of Mud lake, Northport—E. J. Hill; northward to L. Sup.
- Ladies' Tresses. 1142. *cernua*, Richard. Th.
Sphagnous swamps. Frequent.
- Ladies' Tresses. 1143. *gracilis*, Bigelow.
S. W.—Wright Cat.; Macomb Co.; Grand Rapids—Coleman Cat.; Kalamazoo—Tuthill.

LISTERA

- Twayblade. 1144. *cordata*, R. Br. U. P.
Whitney Cat.; and Isle Royale—Dr. A. B. Lyons.
- Twayblade. 1145. *convallarioides*, Hook. U. P.
Not common—Whitney Cat.; Isle Royale—Dr. A. B. Lyons.

ARETHUSA

- Arethusa. 1146. *bulbosa*, L. Th.
In sphagnous swamps. S. Mich.—Wright Cat.; Ann Arbor—Allmend. Cat.; Kalamazoo—Tuthill; Hubbardston (!); and northward. Rare.

POGONIA

- Pogonia. 1147. *ophioglossoides*, Nutt. Th.
Bogs. Common.
- Pogonia. 1148. *pendula*, Lindl. S. W.
Dr. Wright. Rare.
- Pogonia. 1149. *verticillata*, Nutt. C. & S.
Kalamazoo; Flint; Macomb Co. Rare.

CALOPOGON

- Beautiful Calopogon. 1150. *pulchellus*, R. Br. Th.
Bogs. Common.

CALYPSO

- Calypso. 1151. *borealis*, Salisb.
Forty-mile Point, Presque Isle Co.—Winch. Cat.; shores of Higgins Lake—
Dr. D. Cooley; Mackinac—Whitney Cat.; L. Superior—J. Macoun, in
Can. Cat. Local.

TIPULARIA

- Crane-fly Orchis. 1152. *discolor*, Nutt.
Coleman Cat.; "N. Mich., Dr. Cooley"—Winch. Cat.; eastern coast of L.
Huron—J. Macoun. Our rarest orchid.

MICROSTYLIS

- Adder's-mouth. 1153. *monophyllos*, Lindl.
Hubbardston(!); Flint; Macomb Co. Rare.
- Adder's-mouth. 1154. *ophioglossoides*, Nutt.
Ann Arbor—Allmendinger Cat.; Hubbardston(!). Rare.

LIPARIS

- Twayblade. 1155. *Loeselii*, Richard.
Ann Arbor—Allmendinger Cat.; abundant in a tamarack swamp near
Hubbardston(!); S. Haven—Bailey; Flint; Macomb Co.
- Twayblade. 1156. *liliifolia*, Richard.
S. W.—Wright's Cat.

CORALLORHIZA

- Coral-root. 1157. *innata*, R. Br. Th.
S. E.—Wright Cat.; L. Superior, not rare—Whitney Cat.
- Coral-root. 1158. *odontorhiza*, Nutt. (***) Th.
Hubbardston(!); Flint; northward to L. Superior—Whitney Cat.
- Coral-root. 1159. *multiflora*, Nutt. Th.
Hubbardston(!); Lansing—Bailey; S. W.—Wright Cat.; northward to L.
Superior.
- Coral-root. 1160. *Macraei*, Gray.
Abundant at Mackinac—Whitney Cat.

APLECTRUM

- Putty-root. 1161. *hyemale*, Nutt. C. & S.
Adam-and-Eve. Rich woods. Ann Arbor—Allmend. Cat.; Lansing—Bailey; Detroit—Gill
man; Macomb Co.; Montcalm Co. (!); Flint; Hubbardston (!); Grand
Rapids—Coleman's Cat. Scarce.

CYPRIPEDIUM

- Ram's head Lady's Slipper. 1162. *arietinum*, R. Brown. (***) U. P.
Isle Royale—Dr. A. B. Lyons. May be looked for in L. P.
- Small White Lady's Slipper. 1163. *candidum*, Muhl. (***) C. & S.
Tamarack swamps. Ann Arbor—Winch. Cat.; Kalamazoo; Macomb Co.,
Flint; Hubbardston (!). Rare.

- Smaller Yellow Lady's Slipper. 1164. *parviflorum*, Salisb. (**) Th.
Swamps. A slender species; leaves slightly pubescent, not much plaited; flowers much smaller than those of the next; corolla bright yellow and much brown spotted inside in lines; sepals and side petals dark brown-purple, the latter several times twisted. Usually grows in clumps, preferring very wet swamps. Frequent.
- Larger Yellow Lady's Slipper. Moccasin-Flower. 1165. *pubescens*, Willd. (**) L. P.
Woods, in moist or dry ground. Much coarser every way than the preceding, with strongly-plaited, hairy leaves, and large light yellow flowers, more or less brown-spotted. Small forms of this are often mistaken for *C. parviflorum*, but the two species are apparently distinct in Mich. Common.
- Showy Lady's Slipper. Pink L. S. 1166. *spectabile*, Swartz. (***) C. & S.
Swamps. The largest species, as well as the most beautiful; leaves frequently 6x10 inches. Ann Arbor—Winch. Cat.; Kalamazoo—Tuthill; Lansing—Bailey; Macomb Co.; Flint; Hubbardston (!), etc. Desirable for cultivation. Frequent.
- Stemless Lady's Slipper. 1167. *acaule*, Ait. (***) Th.
Moist woods and sphagnum swamps. Montcalm Co. (!), etc. Frequent.

AMARYLLIDACEÆ.

(Amaryllis Family.)

HYPOXYS

- Star-grass. 1168. *erecta*, L. C. & S.
Meadows. Common.

HÆMODORACEÆ.

(Bloodwort Family.)

ALETRIS

- Colic root. Star-grass. 1169. *farinosa*, L. (**) C. & S.
Ann Arbor—Allmend. Cat.; Macomb Co.; Flint; Hubbardston (!). Rare.

IRIDACEÆ.

(Iris Family.)

IRIS

- Wild Flower-de-Luce. Larger Blue Flag. Lake Dwarf Iris. 1170. *versicolor*, L. (**) Th.
Low grounds. Common.
1171. *lacustris*, Nutt.
Bois Blanc I. and Drummond's I.—Winch. Cat.; Mackinac—Whitney Cat.; "Shores of L. Huron and Mich."—Gray, Lewis Foote, *et al.*

SISYRINCHIUM

- Blue-eyed Grass. 1172. *Bermudiana*, L. Th.
Moist grassy places. Common.

DIOSCOREACEÆ.

(Yam Family.)

DIOSCOREA

- Wild Yam-root. 1173. *villosa*, L. (**) C. & S.
Rich woods. Frequent.

SMILACEÆ.

(Smilax Family.)

SMILAX

- | | | |
|--------------------|--|---------|
| Common Greenbriar. | 1174. rotundifolia, L. | C. & S. |
| | Ann Arbor—Allmend. Cat.; Flint; Macomb Co.; Kent Co.—Coleman Cat. | |
| Common Greenbriar. | 1175. hispida, Muhl. | Th. |
| | The common woody species in Ionia and adjacent counties. Ann Arbor—Winch. Cat.; Hubbardston (!); Flint; Houghton Lake (!); northward to Lake Superior—Whitney Cat. | |
| Carrian Flower. | 1176. herbacea, L. | Th. |
| | River banks. Flowers much visited by blow-flies. | Common. |
| Carrian Flower. | 1177. herbacea, L., var. pulverulenta, Gr. | |
| | Ann Arbor—Allmend. Cat. | |

LILIACEÆ.

(Lily Family.)

TRILLIUM

- | | | |
|--------------------------------------|--|---------|
| Sessile Trillium. | 1178. sessile, L. | S. |
| | Dr. A. B. Lyons. | |
| Large White Trillium, or Wake Robin. | 1179. grandiflorum, Salisb. (***) | Th. |
| | Rich woods. Exceedingly variable and apt to sport. | Common. |
| Birthroot. Purple T. | 1180. erectum, L. (***) | |
| | Ann Arbor—Winch. Cat. | Rare. |
| Birthroot. | 1181. erectum, L., var. album, Ph. | |
| | Ann Arbor—Winch. Cat. | Rare. |
| Birthroot. | 1182. erectum, L., var. declinatum, Gr. | |
| | The common form in low ground from the C. north. Fruit dark red, six-ribbed, $\frac{1}{4}$ in. in diameter—larger than the fr. of <i>T. grandiflorum</i> . | |
| Nodding Trillium. | 1183. cernuum, L. | C. & S. |
| | S. Mich.—Winch. Cat.; Macomb Co.; Flint; Grand Rapids.—Coleman Cat. | |
| Dwarf White Trillium. | 1184. nivale, Riddell. | C. & S. |
| | Low woods. One of our earliest spring flowers. Only observed along Grand River Valley. Hubbardston (!); Ionia (!); Grand Rapids.—Coleman Cat. | Rare. |
| Painted T. | 1185. erythrocarpum, Michx. | |
| | S. Mich.—Wright Cat.; not observed in the center of the State; said to occur in U. P.—Gray's Manual. | |

MEDEOLA

- | | | |
|-----------------------|---------------------------|-------|
| Indian Cucumber-root. | 1186. Virginica, L. (***) | L. P. |
|-----------------------|---------------------------|-------|

MELANTHIUM

- | | |
|--|---------------------------|
| | 1187. Virginicum, L. |
| | Macomb Co.—Dr. D. Cooley. |

ZYGADENUS

- | | | |
|-----------|---|-------|
| Zygadene. | 1188. glaucus, Nutt. | L. P. |
| | S. W.—Wright Cat.; Dexter,—Dr. Elmore Palmer; Ann Arbor—Allmend. Cat.; Ionia (!); Davisburgh (!); Petoskey (!). | Rare. |

VERATRUM

- | | |
|---------------------------|----------------------------|
| American White Hellebore. | 1189. viride, Ait. (?) (*) |
| | Dr. A. B. Lyons. |

CHAMÆLIRIUM

- Devil's Bit. 1190. *luteum*, Gray. (***)
Dr. A. B. Lyons.

TOFIELDIA

- False Asphodel. 1191. *palustris*, Hudson. U. P.
Isle Royale,—Dr. A. B. Lyons.
False Asphodel. 1192. *glutinosa*, Willd. Th.
Sphagnous swamps. Frequent.

UVULARIA

- Large-flowered Bellwort. 1193. *grandiflora*, Smith. C. & S.
Rich woods. Common.
Mealy Bellwort. 1194. *perfoliata*, L. Th.
Rich woods. Marquette Co.—Burt MS. Cat.; Flint; Macomb Co. Infrequent.

OAKESIA

- Sessile-leaved Oakesia. 1195. *sessilifolia*. Th.
Wild Oats. Low woods. Apparently infrequent S. Ann Arbor—Allmend. Cat.; Ypsilanti (!); Flint; Macomb Co.; Crystal Lake, Montcalm Co. (!); and northward to Marquette Co.,—Whitney Cat.

STREPTOPUS

- Twisted-stalk. 1196. *amplexifolius*, DC.
Fort Gratiot.—Winch. Cat.; Houghton Lake (!); to L. Superior where it is rare—Whitney Cat.
Twisted-stalk. 1197. *roseus*, Michx.
Drummond's Is. and Sugar Is.—Winch. Cat.; to L. Superior where it is very common—Whitney Cat.

CLINTONIA

- Clintonia. 1198. *borealis*, Raf. Th.
Follows the Lake Michigan shore down as far as S. Haven; on the eastern side of the State reaches to Macomb Co.—Dr. D. Cooley; and in the center of the State is found in Ionia Co. (!). Very common north of latitude 43°.

SMILACINA

- False Solomon's Seal. 1199. *racemosa*, Desf. (***) Th.
False Spikenard. Moist grounds. Common.
1200. *stellata*, Desf. Th.
Moist banks. Common.
1201. *trifolia*, Desf. Th.
Sphagnous swamps. Frequent.

MAIANTHEMUM

1202. *bifolia*, DC. Th.
Woods, everywhere.

POLYGONATUM

- Smaller Solomon's Seal. 1203. *biflorum*, Ell. (***) Th.
Ann Arbor.—Winch. Cat.; Ionia Co. (!); and northward. Open woods. Common.
Great S. S. 1204. *giganteum*, Dietrich. (***) Th.
River banks. Stems often very tall and channeled on one side. Intermediate forms between this and the preceding, occur.

ASPARAGUS

- Asparagus. 1205. *officinalis*, L. (***)
Sparsely escaped from gardens in older parts of the State.

LILIUM

- Wild Orange-red Lily. 1206. *Philadelphicum*, L. Th.
Ann Arbor—Allmend. Cat.; Hubbardston (!); Petoskey (!); and northward. Not common in the central part of the State.
- Wild Yellow Lily. 1207. *Canadense*, L. Th.
Meadows and along streams. Common in the center of the State.
1208. *superbum*, L. C. & S.
Low grounds. Ann Arbor (Miss Clark)—Winch. Cat.; Flint; S. Haven—Bailey.

ERYTHRONIUM

- Dog's tooth Violet. 1209. *Americanum*, Smith. (***) Th.
Yellow Ad-der's-tongue. Low copses. Common.
- White A. 1210. *albidum*, Nutt. C. & S.
White Dog's-tooth Violet. Ann Arbor—Allmend. Cat.; Lansing—Bailey; Macomb Co.; Flint; Hubbardston (!). "At L. Superior Dr. Robbins found a plant like this but *yellow-flowered*, a transition towards *E. grandiflorum*."—Gray's Man.

ALLIUM

- Wild Leek. 1211. *triccoccum*, Ait. Th.
Rich woods. Cattle pastured in woodlands in early spring are sure to find and eat this plant, and the "garlic" odor of wild leek is only too well known to butter buyers in the rural districts.
- Wild Onion. 1212. *cernuum*, Roth. S.
Ann Arbor—Allmend. Cat.; Put-in Bay, O.(!)
- Chives. 1213. *Schœnoprasum*, L. U. P.
Dr. A. B. Lyons; Gray's Manual.
- Wild Garlic. 1214. *Canadense*, Kalm. (***) C. & S.
Woods. Common.

JUNCACEÆ.

(Rush Family.)

LUZULA

- Wood-Rush. 1215. *pilosa*, Willd. Th.
Woods. Common.
- Wood-Rush. 1216. *parviflora*, Desv., var. *melanocarpa*, Gr. U. P.
Dr. A. B. Lyons.
- Wood-Rush. 1217. *campestris*, DC. C. & S.
Dry woods. Frequent.
- Wood-Rush. 1218. *spicata*, Desvaux. U. P.
Dr. A. B. Lyons.

JUNCUS

- Common or Soft Rush. 1219. *effusus*, L. Th.
Marshy grounds. Common.
- Rush, or Bog Rush. 1220. *filiformis*, L. Th.
Saginaw Bay—Winch. Cat.; L. Superior—Jno. Macoun.
- Bog Rush. 1221. *Balticus*, Dethard. Th.
Sandy shores. S. Haven—Bailey; to Petoskey (!); and northward.
- Bog Rush. 1222. *stygius*, L.
"N. shore of Lake Superior, Mr. Wheeler."—Gray's Manual.
- Bog Rush. 1223. *marginatus*, Rostk. S. Mich.—Winch. Cat.; Macomb Co.—Dr. D. Cooley.
- Bog Rush. 1224. *bufonius*, L. C. & S.
Roadsides. Common.

- Black-Grass. 1225. *Gerardi*, Loisel.
"Rare along the Great Lakes."—Gray's Man.
- Bog Rush. 1226. *tenuis*, Willd.
Low grounds. A tall form, 2½ feet high, grows at Muir; and Palo, Ionia Co.(!) Common.
- Bog Rush. 1227. *Greenii*, Oakes & Tuckerman. S. E.
Detroit(!).
- Bog Rush. 1228. *Vaseyi*, Engelm. S. E.
With the last.
- Bog Rush. 1229. *pelocarpus*, E. Meyer. L. P.
Bear Lake, Manistee Co.—E. J. Hill; Macomb Co.—Dr. D. Cooley.
- Bog Rush. 1230. *articulatus*, L. Th.
S. Haven—Bailey; common at Petoskey(!); and northward.
- Bog Rush. 1231. *alpinus*, Villars, var. *insignis*, Fries. U. P.
"Along the Great Lakes northward and westward."—Gray.
- Bog Rush. 1232. *acuminatus*, Michx., var. *legitimus*, Engelm. C. & S.
Macomb Co.; Fruitport—E. J. Hill; Hubbardston(!).
- Bog Rush. 1233. *nodosus*, L. Th.
Gravelly banks. Common.
- Bog Rush. 1234. *nodosus*, L., var. *megacephalus*, Torr.
Montcalm Co.(!)
- Bog Rush. 1235. *brachycarpus*, Engelm.
Dr. Engelmann.
- Bog Rush. 1236. *Canadensis*, J. Gay, var. *longicaudatus*, Engelm. C. & S.
Fruitport—E. J. Hill; Macomb Co.; Lansing.
- Bog Rush. 1237. *Canadensis*, J. Gay, var. *brachycephalus*, Engelm.
Hubbardston(!).
- Bog Rush. 1238. *Canadensis*, J. Gay, var. *coarctatus*, Engelm.
Muir(!); Hubbardston(!); to L. Superior.

PONTEDERIACEÆ.

(Pickereel-weed Family.)

PONTEDERIA

- Pickereel-weed. 1239. *cordata*, L. Th.
Borders of lakes and slow streams. Lakes in Oakland Co.(!); Ann Arbor; Ionia Co. (!); and northward.

SCHOLLERA

- Water Star-grass. 1240. *graminea*, Willd. C. & S.
Ann Arbor.—Allmend, Cat.; Dexter.—Dr. Elmore Palmer; Grand Rapids(!); Hubbardston(!). In streams. Common.

COMMELYNACEÆ.

(Spiderwort Family.)

COMMELYNA

- Day-flower. 1241. *Virginica*, L. S. W.
Wright Cat.

TRADESCANTIA

- Common Spiderwort. 1242. *Virginica*, L. C. & S.
Moist woods. Ionia Co.(!); Grand Rapids(!); Ann Arbor.—Allmendinger Cat. Frequent. Often cultivated in the Eastern States.

XYRIDACEÆ.

(Yellow-eyed Grass Family.)

XYRIS

Yellow-eyed
Grass.

1243. *flexuosa*, Muhl.
Macomb Co.(!); S. W.—Wright Cat.

ERIOCAULONACEÆ.

(Pipewort Family.)

ERIOCAULON

Pipewort:

1244. *septangulare*, With.
S. W.—Wright Cat.; Macomb Co. Infrequent.

CYPERACEÆ.

(Sedge Family.)

CYPERUS

- Galingale. 1245. *flavescens*, L.
Grand Rapids.—Coleman Cat.; S. Mich.—Wright Cat.
- Galingale. 1246. *diandrus*, Torr. C. & S.
Low grounds.
- Galingale. 1247. *erythrorhizos*, Muhl.
Macomb Co.—Dr. D. Cooley.
- Galingale. 1248. *inflexus*, Muhl.
Coleman Cat.
- Galingale. 1249. *phymatodes*, Muhl. C. & S.
Nut-grass. A troublesome weed on low grounds, spreading rapidly by means of its
nut-like tubers. Hard to eradicate. Muir (!); Flint; Grand Rapids, etc.
Frequent.
- Galingale. 1250. *strigosus*, L. C. & S.
Low grounds. Common.
- Galingale. 1251. *Michauxianus*, Schultes.
Low grounds. Hubbardston (!); Flint, etc. Common.
- Galingale. 1252. *Engelmanni*, Steud.
Fruitport.—E. J. Hill.
- Galingale. 1253. *Schweinitzii*, Torr. S. W.
Lake Michigan Shore at S. Haven,—Bailey.
- Galingale. 1254. *fliculmis*, Vahl. C. & S.
Sterile soil. Common.

KYLLINGIA

- Kyllingia. 1255. *pumila*, Michx. S.
Dr. Lyons.

DULICHIMUM

- Dulichium. 1256. *spathaceum*, Pers. Th.
Borders of ponds and swamps. Common.

FUIRENA

- Umbrella
Grass. 1257. *squarrosa*, Michx., var. *pumila*, Torr.
Macomb Co.—Dr. D. Cooley.

HEMICARPHA

- Hemicarpha. 1258. *subsquarrosa*, Nees.
S. W.—Wright Cat.

ELEOCHARIS

- Spike-rush. 1259. *equisetoides*, Torr.
S. E.—Wright Cat.
- Spike-rush. 1260. *quadrangulata*, R. Br. C. & S.
S. Mich.—Gray; Flint; border of Crystal Lake, Montcalm Co. (!). Rare.
- Spike-rush. 1261. *obtusa*, Shultes. C. & S.
Wet grounds. Common.
- Spike-rush. 1262. *palustris*, R. Br. Th.
Wet places. Common.
- Spike-rush. 1263. *rostellata*, Torr.
Marshes. Hubbardston (!); Macomb Co.; Drummond's I.—Winch. Cat.
Rare.
- Spike-rush. 1264. *intermedia*, Schultes.
Macomb Co.—Dr. D. Cooley; Grand Traverse Bay.—Winch. Cat.
- Spike-rush. 1265. *tenuis*, Schultes. C. & S.
S. E.—Wright Cat.; Hubbardston (!) Infrequent.
- Spike-rush. 1266. *acicularis*, R. Br.
Muddy shores. Common.
- Spike-rush. 1267. *pygmaea*, Torr. C.
Near salt springs. Flint; Maple River, Clinton Co. (!) Rare.

SCIRPUS

1268. *pauciflorus*, Lightfoot.
Michigan and northwestward.—Gray's Man.
1269. *caespitosus*, L. U. P.
Dr. A. B. Lyons.
1270. *Clintonii*, Gray. C.
Bluffs along Fish Creek, Hubbardston (!); Flint—Dr. D. Clark. Rare.
1271. *planifolius*, Muhl. Rare.
Flint; Macomb Co.
1272. *subterminalis*, Torr. C. & S.
Houghton Lake (!); Woodard Lake, Ionia Co. (!); Flint; Macomb Co.; S. Mich.—Wright Cat. Infrequent.
- Bulrush. 1273. *pungens*, Vahl. L. P.
Borders of ponds. Common.
- Bulrush. 1274. *Torreyi*, Olney.
Borders of ponds.—Gray.
- Bulrush. 1275. *validus*, Vahl. Th.
In still water. Common.
1276. *Smithii*, Gray.
Macomb Co.
- Sea Club Rush. 1277. *maritimus*, L. S.
S. Mich.—Wright Cat.
- River Club Rush. 1278. *fluviatilis*, Gray. C. & S.
Margins of rivers. S. Mich.—Winch. Cat.; Macomb Co.; Hubbardston (!); abundant along Maple River.
1279. *atrovirens*, Muhl. Th.
Wet meadows. Common.
1280. *polyphyllus*, Vahl.
S. Mich.—Wright Cat.

Bulrush.	1281. <i>lineatus</i> , Michx.	C. & S. River banks. S. Mich.—Winch. Cat.; Flint; Macomb Co.; Hubbardston (!). Infrequent.
Wool-grass.	1282. <i>Eriophorum</i> , Michx.	Th. Wet meadows. Frequent.

ERIOPHORUM

Alpine Cotton-grass.	1283. <i>alpinum</i> , L.	Th. Mud Lake (!); Petoskey—E. J. Hill; Macomb Co. Infrequent.
Sheathed Cotton-grass.	1284. <i>vaginatum</i> , L.	Th. Sphagnous swamps. S. Mich.—Winch. Cat.; Lansing—Baily; Macomb Co.; Hubbardston (!); Stanton (!); and northward. Rare.
Virginian Cotton-grass.	1285. <i>Virginicum</i> , L.	Th. Sphagnous swamps. Ann Arbor—Allmend. Cat.; Flint; Hubbardston (!); northward. Infrequent.
Many Stemmed Cotton-grass.	1286. <i>polystachyon</i> , L.	L. P. Swamps. Common.
Graceful Cotton-grass.	1287. <i>gracile</i> , Koch.	Th. S. Mich.—Wright Cat.; Flint; Hubbardston (!); Montcalm Co. (!); and northward. Rare.

FIMBRISTYLIS

	1288. <i>spadicea</i> , Vahl., var. <i>castanea</i> , Gr.	S. S. W.—Wright Cat.
	1289. <i>autumnalis</i> , Rœm. & Schultes.	S. Mich.—Wright Cat.
	1290. <i>capillaris</i> , Gray.	S. Mich.—Winch. Cat.; Detroit (!).

RHYNCHOSPORA

Beak Rush.	1291. <i>alba</i> , Vahl.	L. P. Bogs. Ann Arbor—Allmend. Cat.; Macomb Co.; Hubbardston (!); N. E.— Winch. Cat. Infrequent.
Beak Rush.	1292. <i>capillacea</i> , Torr.	Th. Bogs and sandy lake shores. Hubbardston (!); Flint; Macomb Co.; Pe- toskey (!). Infrequent.
Beak Rush.	1293. <i>capillacea</i> , Torr., var. <i>leviseta</i> , Hill.	Shore Grand Traverse Bay, near Torch Lake—E. J. Hill.
Beak Rush.	1294. <i>glomerata</i> , Vahl.	S. Mich.—Wright Cat.; Macomb Co.

CLADIUM

Twig Rush.	1295. <i>mariscoides</i> , Torr.	C. & S. Bogs. S. Mich.—Wright Cat.; Macomb Co.; Flint; Hubbardston (!).
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SCLERIA

Nut Rush.	1296. <i>triglomerata</i> , Michx.	C. & S. S. Mich.—Wright Cat.; Macomb Co.; Flint.
Nut Rush.	1297. <i>verticillata</i> , Muhl.	Macomb Co.—Dr. D. Cooley.

CAREX

Sedge.	1298. <i>gynocrates</i> , Wormskiold.	N. E. and N. W.—Winch. Cat.
Sedge.	1299. <i>scirpoidea</i> , Michx.	N. E.—Winch. Cat.
Sedge.	1300. <i>pauciflora</i> , Lightfoot.	U. P. U. P.—Dr. A. B. Lyons; Chocolate R., L. Superior—Henry Gillman.

Sedge.	1301. polytrichoides, Muhl.	Th.
	Low grounds.	Common.
Sedge.	1302. Willdenovii, Schk.	
	Bear Lake, Van Buren Co.—E. J. Hill.	Rare.
Sedge.	1303. Steudelii, Kunth.	
	Dr. A. B. Lyons.	
Sedge.	1304. Backii, Boott.	U. P.
	Ontonagon River.—Whitney Cat.	
Sedge.	1305. bromoides, Schk.	Th.
	Low grounds.	Common.
Sedge.	1306. siccata, Dew.	C.
	Barrens. Macomb Co.; Flint; Hubbardston(!).	Infrequent.
Sedge.	1307. disticha, Huds.	Th.
	S. Mich.—Winch. Cat.; Macomb Co.; Flint, Hubbardston(!) and northward.	
Sedge.	1308. teretiuscula, Good.	Th.
	Swamps.	Common.
Sedge.	1309. teretiuscula, var. major, Koch.	
	Hubbardston(!).	
Sedge.	1310. decomposita, Muhl.	
	Hubbardston(!); Ann Arbor.—Allmendinger Cat.; S. Mich.; Wright Cat.	Very rare.
Sedge.	1311. vulpinoidea, Michx.	Th.
	Low meadows.	Common.
Sedge.	1312. Nuttallii, Schw.	
	Dr. A. B. Lyons.	
Sedge.	1313. stipata, Muhl.	Th.
	Low grounds.	Common.
Sedge.	1314. conjuncta, Boott.	
	Flint.—Dr. D. Clark. Hubbardston(!).	Infrequent.
Sedge.	1315. alopecoidea, Tuckerman.	
	Macomb Co.; Gray's Man.	
Sedge.	1316. muricata, L.	
	Macomb Co.—Dr. D. Cooley.	
Sedge.	1317. sparganioides, Muhl.	C. & S.
	Low, rich grounds.	Frequent.
Sedge.	1318. cephaloidea, Dew. & Boott.	C. & S.
	Fields. Macomb Co.—Cooley; Ann Arbor.—Allmend. Cat.	
Sedge.	1319. cephalophora, Muhl.	C. & S.
	Open woods.	Common.
Sedge.	1320. Muhlenbergii, Schk.	C. & S.
	Fields. Hubbardston (!); Macomb Co.	Infrequent.
Sedge.	1321. rosea, Schk.	
	Moist woods.	Frequent.
Sedge.	1322. rosea, Schk., var. retroflexa, Olney.	
	Dr. A. B. Lyons.	
Sedge.	1323. chordorhiza, Ehrh.	Th.
	Upland swamps. Macomb Co.; Hubbardston (!); Stanton, Montcalm Co.	Rare.
Sedge.	1324. tenella, Schk.	Th.
	S. E.—Wright Cat.; Macomb Co.; Flint; Hubbardston (!); Petoskey; and northward.	
Sedge.	1325. trisperma, Dew.	C. N. & U. P.
	Upland swamps. Hubbardston (!); Flint; Macomb Co.; and northward.	Frequent.

- Sedge. 1326. *tenuiflora*, Wahl.
Macomb Co.; U. P.—Whitney Cat.
- Sedge. 1327. *canescens*, L. Th.
S. Mich.—Wright Cat.; Hubbardston (!); Flint; Macomb Co.; and northward. Swamps. Frequent.
- Sedge. 1328. *vitis*, Fries. Th.
Hubbardston (!); Flint, etc. Infrequent.
- Sedge. 1329. *Deweyana*, Schw. Th.
Woods. Frequent.
- Sedge. 1330. *sterilis*, Willd. Th.
S. Mich.—Winch. Cat.; Hubbardston (!); Flint; Macomb Co.; and northward.
- Sedge. 1331. *stellulata*, L. Th.
S. E.—Wright Cat.; Hubbardston (!); Flint; Macomb Co.; and northward.
- Sedge. 1332. *sychnocephala*, Carey.
Crystal, Montcalm Co. (!); the only known station in the State.
- Sedge. 1333. *Muskingumensis*, Schw.
Borders of a marsh in Ronald, Ionia Co. (!); Flint.
- Sedge. 1334. *scoparia*, Schk.
Low grounds, everywhere.
- Sedge. 1335. *lagopodioides*, Schk. Common.
Moist shady places.
- Sedge. 1336. *lagopodioides*, Schk., var. *cristata*, Carey, C. & S.
Low grounds. Common.
- Sedge. 1337. *lagopodioides*, Schk., var. *mirabilis*, Olney. Common.
With the last.
- Sedge. 1338. *albalutescens*, Schw.
Hubbardston (!).
- Sedge. 1339. *straminea*, Schk., var. *typica*, Boott.
Ann Arbor,—Allmendinger Cat.; Flint.
- Sedge. 1340. *straminea*, Schk., var. *festuacea*, Boott.
S. Mich.—Winch. Cat.; Macomb Co.; Flint; Hubbardston (!). Infrequent.
- Sedge. 1341. *tenera*, Dewey.
Ann Arbor.—Allmendinger Cat.; Macomb Co.; Flint; Hubbardston (!). Frequent.
- Sedge. 1342. *tenera*, Dewey, var. *major*, Olney.
Hubbardston (!).
- Sedge. 1343. *vulgaris*, Fries.
S. Mich.—Wright Cat.; Coleman Cat.
- Sedge. 1344. *aquatis*, Wahl. Th.
Margins of streams. S. Mich.—Wright Cat.; Flint; Macomb Co. Hubbardston (!); Sitting Rabbit—Winch. Cat. Infrequent.
- Sedge. 1345. *torta*, Boott. (?).
- Sedge. 1346. *stricta*, Lam. Th.
Low grounds. Common.
- Sedge. 1347. *lenticularis*, Michx. U. P.
"Upper Michigan,"—Gray; Laughing Fish R., L. Superior—Henry Gillman.
- Sedge. 1348. *crinita*, Lam. Th.
Low grounds. Common.
- Sedge. 1349. *gynandra*, Schw., Boott.
Dr. Gray.

- Sedge. 1350. *limosa*, L. Th.
Bogs. Ann Arbor—Allmend. Cat.; Macomb Co.; Hubbardston(!); and northward. Infrequent.
- Sedge. 1351. *irrigua*, Smith. C., N. & U. P.
Sphagnous swamps. Macomb Co.; Isabella Co.(!) Rare.
- Sedge. 1352. *Buxbaumii*, Wahl. Th.
Bogs. S. E.—Winch. Cat.; Lansing—Bailey; Macomb Co.; Hubbardston(!); northward to L. Superior—Whitney Cat.
- Sedge. 1353. *alpina*, Schw. U. P.
Isle Royale—Whitney Cat.
- Sedge. 1354. *aurea*, Nutt. Th.
Borders of cool springs. S. E.—Wright Cat.; Ann Arbor—Allmend. Cat.; Macomb Co.; Hubbardston(!); Petoskey(!); and northward. Infrequent.
- Sedge. 1355. *livida*, Willd. (?)
- Sedge. 1356. *panicea*, L., var. *refracta*, Olney. U. P.
"Lake Superior (*Robbins and Porter*) and northward."—Gray.
- Sedge. 1357. *panicea*, L., var. *Meadii*, Olney. C. & S.
Macomb Co.; Hubbardston(!).
- Sedge. 1358. *panicea*, L., var. *tetanica*, Olney. C. & S.
S. Mich.—Winch. Cat.; Macomb Co.; Flint; Hubbardston(!).
- Sedge. 1359. *microdonta*, Torr. Rare.
N. Mich.—Winch. Cat.; Macomb Co.
- Sedge. 1360. *Haleana*, Olney.
Banks of Fish creek, Hubbardston(!).
- Sedge. 1361. *granularis*, Muhl. Th.
Low grounds. Common.
- Sedge. 1362. *Torreyi*, Tuckerman. U. P.
Dr. A. B. Lyons.
- Sedge. 1363. *pallescens*, L.
Dr. A. B. Lyons.
- Sedge. 1364. *conoidea*, Schk. C. & S.
S. E.—Wright Cat.; Flint. Infrequent.
- Sedge. 1365. *grisea*, Wahl.
Moist woods. Hubbardston(!); Flint; Drummond's I.—Winch. Cat.; to Lake Superior—Whitney Cat. Frequent.
- Sedge. 1366. *Davisii*, Schw. & Torr.
Sitting Rabbit—Winch. Cat.
- Sedge. 1367. *formosa*, Dew. C. & S.
S. Mich.—Winch. Cat.; Macomb Co.
- Sedge. 1368. *gracillima*, Schk. Th.
Wet meadows. Common.
- Sedge. 1369. *virescens*, Muhl. S.
S. Mich.—Winch. Cat.; Detroit(!).
- Sedge. 1370. *triceps*, Michx.
In an oak wood on the farm of Hon. N. B. Hayes, in North Plains township, Ionia Co.(!); not known to occur elsewhere in the State.
- Sedge. 1371. *plantaginea*, Lam. Th.
Hillsides. Scarce.
- Sedge. 1372. *Careyana*, Torr. C.
Rich woods. Macomb Co.; Flint; Hubbardston(!). Rare.
- Sedge. 1373. *platyphylla*, Carey. C.
Grand Rapids—Coleman's Cat.; Hubbardston(!). Infrequent.
- Sedge. 1374. *retrocurva*, Dew. C.
Flint; Hubbardston(!). Infrequent.

Sedge.	1375. <i>digitalis</i> , Willd.	C.
	Macomb Co.; Flint; Hubbardston (!).	
Sedge.	1376. <i>laxiflora</i> , Lam.	
	Beech and maple woods. Exceedingly variable. Many forms occur.	Common.
Sedge.	1377. <i>oligocarpa</i> , Schk.	C.
	Flint; Macomb Co.—Dr. D. Cooley.	
Sedge.	1378. <i>Hitchcockiana</i> , Dew.	C.
	Woods. Flint; Hubbardston (!).	
Sedge.	1379. <i>eburnea</i> , Boott.	Th.
	Hillsides.	Frequent.
Sedge.	1380. <i>pedunculata</i> , Muhl.	C. & S.
	Hillsides.	Frequent.
Sedge.	1381. <i>umbellata</i> , Schk.	
	Flint—Dr. D. Clark.	Rare.
Sedge.	1382. <i>Novæ-Angliæ</i> , Schw.	
	S. E.—Wright Cat.	
Sedge.	1383. <i>Emmonsii</i> , Dew.	
	Grand Traverse—Winch. Cat.	
Sedge.	1384. <i>Pennsylvanica</i> , Lam.	C. & S.
	Dry woods.	Common.
Sedge.	1385. <i>varia</i> , Muhl.	Th.
	With the last. Macomb Co.; Hubbardston (!).	Scarce.
Sedge.	1386. <i>Richardsonii</i> , R. Br.	
	Barrens. Ionia Co. (!); Macomb Co.	Scarce.
Sedge.	1387. <i>pubescens</i> , Muhl.	C. & S.
	S. Mich.—Wright Cat.; Macomb Co.; Hubbardston (!) to Lake Superior—Whitney Cat.	Frequent.
Sedge.	1388. <i>miliacea</i> , Muhl.	C. & S.
	Wet meadows. S. Mich.—Winch Cat; Flint.	Frequent.
Sedge.	1389. <i>Scabrata</i> , Schw.	Th.
	Banks of streams. Flint; Grand Rapids—Coleman Cat.; Hubbardston (!), to Lake Superior—Whitney Cat.	Infrequent.
Sedge.	1390. <i>arctata</i> , Boott.	Th.
	Woods. S. Mich.—Winch. Cat; Petoskey (!).	Infrequent.
Sedge.	1391. <i>debilis</i> , Michx.	
	Bear Lake, Van Buren Co.—E. J. Hill.	
Sedge.	1392. <i>capillaris</i> , L.	U. P.
	Point de Tour, Lake Michigan—Gray.	
Sedge.	1393. <i>flexilis</i> , Rudge.	Th.
	Woods. Montcalm Co. (!); Macomb Co.; L. Superior—Whitney Cat.	Rare.
Sedge.	1394. <i>flava</i> , L.	Th.
	Sphagnous swamps. S. E.—Wright Cat.; Montcalm Co.; Hubbardston (!); Petoskey (!); and northward.	Frequent.
Sedge.	1395. <i>Ederi</i> , Ehrh.	Th.
	Margins of lakes. Oakland Co. (!); Flint; Petoskey (!); Drummond's L.—Winch. Cat.	
Sedge.	1396. <i>filiformis</i> , L.	
	Bogs. S. Mich.—Wright Cat.; Hubbardston (!); Macomb Co.; Flint.	Rare.
Sedge.	1397. <i>lanuginosa</i> , Michx.	
	River banks. S. E.—Winch. Cat.; Macomb Co.; Flint; Hubbardston (!); and northward.	Scarce.
Sedge.	1398. <i>Houghtonii</i> , Torr.	
	N. part of Clare Co. (!). Only station known in the State.	

Sedge.	1399. <i>riparia</i> , Curtis. Wet places.	C. & S. Common.
Sedge.	1400. <i>aristata</i> , R. Br. "Lake shores and river banks."—Gray's Manual.	
Sedge.	1401. <i>trichocarpa</i> , Muhl. S. Mich.—Wright Cat.; Macomb Co.	C. & S. Infrequent.
Sedge.	1402. <i>comosa</i> , Boott. Wet places.	C. & S. Common.
Sedge.	1403. <i>Pseudo-Cyperus</i> , L. Margins of streams. S. Mich.—Wright Cat.; Macomb Co.; Hubbardston (!).	Infrequent.
Sedge.	1404. <i>hystericina</i> , Willd. Wet meadows.	Th. Common.
Sedge.	1405. <i>tentaculata</i> , Muhl. Antrim Co.; S. Mich.—Wright Cat.	L. P.
Sedge.	1406. <i>intumescens</i> , Rudge. Swamps.	Th. Common.
Sedge.	1407. <i>Grayii</i> , Carey. Low grounds. Macomb Co.; Flint; Hubbardston (!).	Rare.
Sedge.	1408. <i>lupulina</i> , Muhl. Low grounds.	C. & S. Common.
Sedge.	1409. <i>lupuliformis</i> , Sartwell. Macomb Co.	
Sedge.	1410. <i>folliculata</i> , L. S. Mich.—Wright Cat.; Flint; Macomb Co.; to L. Superior.	
Sedge.	1411. <i>rostrata</i> , Michx. (?)	
Sedge.	1412. <i>subulata</i> , Michx. (?)	
Sedge.	1413. <i>squarrosa</i> , L. S. Mich.—Wright Cat.; Hubbardston (!);	C. & S. Rare.
Sedge.	1414. <i>retrorsa</i> , Schw. River banks.	Th. Frequent.
Sedge.	1415. <i>utriculata</i> , Boott. Swamps.	Th. Common.
Sedge.	1416. <i>monile</i> , Tuckerman. Mud Lake, Petoskey—E. J. Hill.	N.
Sedge.	1417. <i>Tuckermani</i> , Boott. Swamps. S. Mich.—Wright Cat.; Hubbardston (!); Flint; Macomb Co.; and northward.	Frequent.
Sedge.	1418. <i>bullata</i> , Schk. Macomb Co.; Flint.	
Sedge.	1419. <i>oligosperma</i> , Michx. Borders of swamps and lakes. Hubbardston (!); Woodard Lake (!); Farwell (!); Houghton Lake (!).	C.
Sedge.	1420. <i>longirostris</i> , Torr. Woods. Flint; Hubbardston (!).	Rare.

GRAMINEÆ.

(Grass Family.)

LEERSIA

White Grass.	1421. <i>Virginica</i> , Willd. Wet woods.	C. & S. Frequent.
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- Rice Cut-
grass. 1422. *oryzoides*, Swartz. C. & S.
River banks. Frequent.

ZIZANIA

- Indian Rice.
Water-oats. 1423. *aquatica*, L. Th.
Borders of large streams and lakes. Wright Cat.; South Haven—Bailey;
Montcalm Co.; Hubbardston (!); and northward. Yields an edible
grain, formerly gathered by the Indians, and now greedily eaten by
wild ducks which haunt lakes and rivers during its ripening in innu-
merable numbers.
1424. *miliacea*, Michx.
Grand Ledge.—Prof. W. J. Beal.

ALOPECURUS

- Meadow Fox-
tail. 1425. *pratensis*, L.
L. Superior—Whitney Cat.
Floating Fox-
tail. 1426. *geniculatus*, L.
S. Mich.—Wright Cat.; Macomb Co.
Wild Foxtail. 1427. *aristulatus*, Michx.
In water. Lansing—Bailey; Hubbardston (!); Flint; and northward.
Frequent.

PHLEUM

- Timothy.
Herd's Grass. 1428. *pratense*, L.
Meadows everywhere. Cultivated for hay.
1429. *alpinum*, L.
L. Superior—Whitney Cat.

VILFA

- Rush Grass. 1430. *aspera*, Beauv.
Dr. Lyons.
Rush Grass. 1431. *vaginæflora*, Torr.
Dr. Lyons; Flint.

SPOROBOLUS

- Drop-seed
Grass. 1432. *juncus*, Kunth.
Dr. Lyons.
Drop-seed
Grass. 1433. *cryptandrus*, Gray.
S. Mich.—Winch. Cat.
Drop-seed
Grass. 1434. *serotinus*, Gray.
Sandy wet places—Gray's Manual.

AGROSTIS

- Thin Grass. 1435. *perennans*, Tuckerman.
Swamps. S. Mich.—Wright; Macomb Co.; Hubbardston (!). Frequent.
Hair Grass. 1436. *scabra*, Willd. Th.
Sterile soil. Common.
Brown Bent-
grass. 1437. *canina*, L.
Ann Arbor—Winch. Cat.
Red-top. 1438. *vulgaris*, With.
Low meadows everywhere. Naturalized from Europe.
Florin.
White Bent-
grass. 1439. *alba*, L. Th.
With the last, along river banks. Naturalized from Europe. This and the
preceding are thought by some authors to be indigenous.

CINNA

- Wood Reed-
grass. 1440. *arundinacea*, L. Th.
Low Grounds. Frequent.

- Wood Reed-grass. 1441. *arundinacea*, L., var. *pendula*, Gray. N. & U. P.
Petoskey (!); L. Superior—Whitney Cat.

MUHLENBERGIA

- Drop-seed Grass. 1442. *sobolifera*, Trin.
Open rocky woods, Michigan—Gray.
- Drop-seed Grass. 1443. *glomerata*, Trin. Th.
Marshes. Used for forage in Dakota, but too coarse to be of value where anything else is attainable. Frequent.
1444. *Mexicana*, Trin. C. & S.
Low grounds. Common.
1445. *sylvatica*, Torr. and Gray.
Hubbardston (!); Flint; Lansing—Bailey. Frequent.
1446. *Willdenovii*, Trin. C. & S.
Woods. Flint; Macomb Co.; S. Mich.—Wright Cat.
- Nimble Will. 1447. *diffusa*, Schreber. C. & S.
Open woods, and becoming frequent around dwellings. S. Mich.—Wright Cat.; So. Haven—Bailey; Lansing (!); Flint; Hubbardston (!).

BRACHYELYTRUM

1448. *aristatum*, Beauv. Th.
Woods. Frequent.

CALAMAGROSTIS

- Blue Joint. 1449. *Canadensis*, Beauv.
This is a very valuable grass to the lake settlers (U. P.), rarely of many acres in extent. It is cut and stacked in August, and in winter is hauled home by sled or dog-train. It is said to be greedily eaten by the cattle and to be as nourishing as herd's grass [?]. It grows shoulder-high, so that even a small meadow furnishes a great store of hay—Whitney Cat., in 1851.
1450. *Langsdorffii*, Trin.
Flint—Dr. D. Clark.
1451. *stricta*, Trin. Th.
Flint—Dr. D. Clark; and northward to L. Superior.—Gray. Rare.
1452. *confinis*, Nutt.
Flint—Dr. D. Clark.
- Reed Bent-grass. 1453. *Nuttalliana*, Steud.
S. Mich.—Wright Cat.
1454. *longifolia*, Hook. Th.
Sand dunes along L. Michigan. S. Haven—Bailey; Petoskey (!); Point au Chene—Winch. Cat.
- Sea Sand-reed. 1455. *arenaria*, Roth. N. & U. P.
This is one of the few plants found both on the ocean and Great Lake shores. Petoskey (!); Point au Chene—Winch. Cat.

ORYZOPSIS

- Mountain Rice. 1456. *melanocarpa*, Muhl. C. & S.
Woods. S. Mich.—Wright Cat.; S. Haven and Lansing—Bailey; Macomb Co.; Flint; Hubbardston (!). Infrequent.
- Mountain Rice. 1457. *asperifolia*, Michx. Th.
Hillsides. Common.
- Mountain Rice. 1458. *Canadensis*, Torr.
Sterile soil. S. E.—Wright Cat.; Hubbardston (!); Montcalm Co. (!); Macomb Co.; Common in Clare Co (!); frequent from Ionia northward.

STIPA

- Black Oat Grass. 1459. *avenacea*, L.
S. W.—Wright Cat.; South Haven—Bailey.

- Porcupine Grass. 1460. *spartea*, Trin., not of Hook. Th.
 Dry plains. S. Mich.—Wright Cat.; Lansing—Bailey; Macomb Co.; shore of Woodard Lake, Ionia Co. (!); hills along Grand R. near Ionia.

ARISTIDA

- Triple-awned Grass. 1461. *purpurascens*, Poir. Infrequent.
 S. Mich.—Winch. Cat.; Flint; Macomb Co.

SPARTINA

- Fresh-water Cord-Grass. 1462. *cynosuroides*, Willd. C. & S.
 Banks of rivers. Frequent.

BOUTELOUA

- Muskit-Grass. 1463. *curtipendula*, Gray. S.
 Dry plains. S. Mich.—Wright Cat.; Macomb Co. Infrequent.

ELEUSINE

- Dog's-tail or Wire-Grass. 1464. *Indica*, Gærtn.
 Ionia Co. (!); Lansing and South Haven—Bailey; S. Mich.—Wright Cat.

TRICUSPIS

- Tall Red-top. 1465. *seslerioides*, Torr. S.
 S. Mich.—Wright Cat.

GRAPHEPHORUM

1466. *melicoides*, Beauv. Th.
 River banks, Macomb Co.; Flint; Hubbardston (!); Petoskey (!); Grand Detour, Upper Michigan.—Prof. Porter.
 1467. *melicoides*, Beauv., var. *major*, Gray.
 Montcalm Co. (!); Macomb Co.

DIARRHENA

- Diarrhena. 1468. *Americana*, Beauv. S.
 S. Mich.—Wright Cat.; Flint; Hubbardston (!). Reaches its northern limit in Ionia Co. Rare.

DACTYLIS

- Orchard Grass. 1469. *glomerata*, L.
 A valuable grass for pasture and hay; becoming naturalized.

KÆLERIA

- Kæleria. 1470. *cristata*, Pers. Th.
 Dry hills. Frequent.

EATONIA

- Eatonia. 1471. *obtusata*, Gray. Rare.
 S. E.—Wright Cat.; Flint; Hubbardston (!).
 Eatonia. 1472. *Pennsylvanica*, Gray. Th.
 Moist woods. Common.
 Eatonia. 1473. *Pennsylvanica*, Gray, var. *major*, Torr.
 Flint; spikelets purplish-tinged at Petoskey (!).

MELICA

- Melic-Grass. 1474. *mutica*, Walt.
 Macomb Co.—Dr. D. Cooley.

GLYCERIA

- Rattlesnake-Grass. 1475. *Canadensis*, Trin.
 Borders of marshes. S. W.—Winch. Cat.; Flint; Ionia Co. (!)

1476. *elongata*, Trin.
Wet woods—Gray; Flint—Dr. Clark.
1477. *nervata*, Trin. Th.
Low meadows Common.
1478. *pallida*, Trin.
Shallow water. Macomb Co.; Flint; Hubbardston (!); and northward.
1479. *aquatica*, Smith. Th.
Wet grounds. Common.
1480. *fluitans*, R. Br. Th.
Shallow water. Common.
1481. *acutiflora*, Torr.
Flint—Dr. D. Clark.
- POA
- Low Spear-Grass. 1482. *annua*, L. Th.
Low grounds. Common.
- Wire-Grass. 1483. *compressa*, L. Th.
Dry fields. Nutritious and would make good hay if it could be grown in quantity. Common.
1484. *alpina*, L. U. P.
Isle Royale—C. G. Loring, Jr., in Gray's Manual.
1485. *cæsia*, Smith, Th.
Flint; Petoskey (!); and northward.
1486. *cæsia*, Smith, var. *strictior*, Gr.
Petoskey (!); Isle Royale—C. G. Loring, Jr., in Gray's Manual.
- False Red-top. 1487. *serotina*, Ehrh. Th.
Fowl Meadow-Grass. Wet meadows, where it is a valuable grass—sometimes mistaken for Red-top, *Agrostis vulgaris*. Common.
- Kentucky Blue-Grass. 1488. *pratensis*, L. Th.
June-Grass. Pastures and meadows. Our most valuable pasture grass; not of much value for hay. Blossoms in June.
- Roughish Meadow-Grass. 1489. *trivialis*, L.
S. Mich.—Wright Cat.; Flint.
1490. *sylvestris*, Gray. C. & S.
Low woods. S. Mich.—Winch. Cat.; Flint; Hubbardston (!). Rare.
1491. *debilis*, Torr. C. & S.
Hillsides. S. Mich.—Winch. Cat.; Macomb Co.; Hubbardston (!). Frequent.
1492. *alsodes*, Gray. C. & S.
Banks of streams. Flint; Hubbardston (!); etc. Infrequent.
1493. *flexuosa*, Muhl. Rare.
Flint—Dr. D. Clark; Hubbardston (!).
- ERAGROSTIS
- Eragrostis. 1494. *reptans*, Nees. C. & S.
Gravelly borders of streams. Common.
- Eragrostis. 1495. *poæoides*, Beauv., var. *megastachya*, Gr. C. & S.
Waste places and gardens,—a common weed. The sp. does not occur. Common.
- Eragrostis. 1496. *pilosa*, Beauv. S.
Grand Rapids—Coleman's Cat.; Macomb Co.
- Eragrostis. 1497. *Frankii*, Meyer.
Roadsides in low ground. Lansing (!); Hubbardston (!); Gratiot Co. (!), etc. Frequent.

- Eragrostis. 1498. *capillaris*, Nees.
Coleman's Cat.; S. Mich.—Wright Cat.; Prof. M. W. Harrington.
- Eragrostis. 1499. *pectinacea*, Gray. C. & S.
Dry sandy ground. S. Mich.—Wright Cat. Reaches its northern limits at
Muir, Ionia Co. (!). Infrequent.

FESTUCA

- Fescue-Grass. 1500. *tenella*, Willd. L. P.
Dry grounds. Common in the center of the State; N. to Petoskey (!).
- Sheep's Fescue. 1501. *ovina*, Gray. Th.
Dry ground. Common.
- Sheep's Fescue. 1502. *ovina*, Gray, var. *duriuscula*, Gray.
S. Mich.—Wright Cat.; Petoskey (!).
- Sheep's Fescue. 1503. *ovina*, Gray, var. *rubra*, Gray.
"Lake Superior, Dr. Robbins."—Gray's Manual.
- Meadow Fescue. 1504. *elatio*r, L.
Meadows. Flint.
- Meadow Fescue. 1505. *elatio*r, L., *pratensis*, Gray.
Kalamazoo—Tuthill; Hubbardston (!).
- Nodding Fescue. 1506. *nutans*, Willd. L. P.
Woods. Frequent.

BROMUS

- Oheat or Chess. 1507. *secalinus*, L. Th.
Fields. Too common in wheat fields. There is a wide-spread notion, among farmers, that wheat changes or degenerates into this grass. It is needless to say that it is wholly without foundation. Often as many as thirty well-developed stalks grow from a single grain in rich soil, each stalk maturing a hundred grains or more. It is perhaps the worst intruder in our wheat fields, from the fact that its grain is about the size of the wheat kernel, and not easily separated from it. This grass seldom troubles the better class of farmers.
- Upright Chess. 1508. *racemosus*, L.
Flint—Dr. D. Clark.
- Wild Chess. 1509. *Kalmii*, Gray. C. & S.
Dry, open woods. S. E.—Wright Cat.; Flint; Macomb Co.; Hubbardston (!).
1510. *ciliatus*, L. Th.
Moist woods. We have several forms; the most peculiar of which is found growing on low sand dunes at the head of Little Traverse Bay (!).

PHRAGMITES

- Reed. 1511. *communis*, Trin. L. P.
Swamps. From S. Mich.—Wright Cat.; Chandler marsh, Lansing (!); Maple River (!), etc.; to Crooked Lake, Emmet Co. (!). Infrequent.

LOLIUM

- Common Darnel. 1512. *perenne*, L.
Macomb Co.—Dr. Cooley; Ionia Co. (!), etc. Scarcely naturalized.
- Bearded Darnel. 1513. *temulentum*, L. (***)
Scarcely naturalized. Flint; Macomb Co.; S. Mich.—Wright Cat.

TRITICUM.

- Couch, Quitch, Quick, or Quack Grass. 1514. *repens*, L. (***) Th.
Cultivated grounds. Varies greatly. Sometimes grows to the exclusion of everything else, but not wide-spread enough to be considered a pest.
1515. *repens*, L., var. *memorale*, Anders.
Petoskey—E. J. Hill.

1516. *dasystachium*, Gray. N. & U. P.
Common at Petoskey (!); N. W.—Winch. Cat.
1517. *violaceum*, Horneman. Th.
Flint; Hubbardston (!); Petoskey (!).
- Awned
Wheat-Grass. 1518. *caninum*, L. Th.
S. Mich.—Winch. Cat.; Macomb Co.; Hubbardston (!).
- HORDEUM**
- Squirrel-tail
Grass. 1519. *jubatum*, L. S. W.
Sands. Common.
- ELYMUS**
- Lyme Grass.
Wild Rye. 1520. *Virginicus*, L. Th.
River banks. Common.
- Wild Rye. 1521. *Canadensis*, L. Th.
River banks. Common.
- Wild Rye. 1522. *Canadensis*, L., var. *glaucifolius*, Gray.
Ionia Co. (!); Ingham Co. (!), etc. Specimens from banks of Red Cedar
River, Lansing, measured six feet, with leaves one inch wide.
- Wild Rye. 1523. *Sibiricus*, L. U. P.
S. shore of L. Superior—Porter in Gray's Manual.
- Wild Rye. 1524. *striatus*, Willd. Th.
S. Mich.—Wright Cat.; Flint; Hubbardston (!); northward to L. Superior.
- Wild Rye. 1525. *mollis*, Trin. Th.
Shores of the Great Lakes—Gray's Manual.
- GYMNOSTICHUM**
- Bottle-brush
Grass. 1526. *Hystrix*, Schreb. Th.
Moist woods. A variety of this grass is found in one locality near Hub-
bardston with smooth and very glaucous culms, leaves rough, hairy.
- DANTHONIA**
- Wild Oat-
Grass. 1527. *spicata*, Beauv. Th.
Sterile soil. Frequent.
- AVENA**
- Oat. 1528. *striata*, Michx. C. & S.
S. E.—Wright Cat.; Macomb Co.; Flint; Hubbardston (!).
1529. *Smithii*, T. C. Porter. U. P.
Isle Royale, Keweenaw Point—Dr. Robbins in Gray's Man.; and woods
near Sault Ste. Marie—C. E. Smith.
- TRisetum**
- Trisetum. 1530. *subspicatum*, Beauv., var. *molle*, Gray. U. P.
Whitney Cat.
- Common Hair-
Grass. 1531. *flexuosa*, L. Infrequent.
Dry places. Th.
- Hair-Grass. 1532. *cæspitosa*, L. Th.
Bogs. S. Mich.—Wright Cat.; Flint; Hubbardston (!); Petoskey (!).
Frequent.
- ARRHENATHERUM**
- Oat-Grass. 1533. *avenaceum*, Beauv. Th.
Macomb Co., etc. Escaped from culture.
- HIEROCHLOA**
- Vanilla or Sen-
eca-Grass. 1534. *borealis*, Rœm. & Schultes. Th.
Not confined to the shores of the Great Lakes; found in the central part
of the State at Ionia (!); Hubbardston (!); Macomb Co.; Flint; S. E.—
Winch. Cat., etc. Common.

ANTHOXANTHUM

- Sweet Vernal-Grass. 1535. *odoratum*, L.
Ionia (!); Grand Rapids—Coleman Cat.; Petoskey (!). Rare.

PHALARIS

- Reed Canary-Grass. 1536. *arundinacea*, L. Th.
Borders of streams. Rare in L. P. "Var. *picta*, the leaves striped with white, is the familiar ribbon-grass of the garden."—Gray's Manual. Lansing—Bailey; Ann Arbor—Prof. M. W. Harrington; S. Mich.—Winch. Cat.; Macomb Co.; Flint; Hubbardston (!); northward to L. Superior—Whitney Cat. Infrequent.

MILIUM

- Millet-Grass. 1537. *effusum*, L. Th.
Woods. Frequent.

PANICUM

- Panic-Grass. 1538. *filiforme*, L.
S. W.—Wright Cat.
1539. *glabrum*, Gaudin.
Waste places. Common.
Common Crab or Finger Grass. 1540. *sanguinale*, L.
Waste places, gardens, and fields. A bad weed, difficult to dig up or pull out; grows quickly and is perhaps the worst weed we have in gardens at least in some localities. *P. glabrum* grows in the same situations but is smaller, and easily eradicated.
Old-witch Grass. 1541. *capillare*, L.
Sandy soil, fields. The spreading panicle is easily broken off and blown about by the wind. Common.
Panic-Grass. 1542. *virgatum*, L.
S. Mich.—Wright Cat.; and northward to Ionia (!); Flint. A tall coarse grass along rivers. Infrequent.
Panic-Grass. 1543. *latifolium*, L.
Rich woods. C. & S. Common.
Panic-Grass. 1544. *clandestinum*, L.
Low grounds. Macomb Co.; Lansing (!), Flint (!), Hubbardston (!). Rare.
Panic-Grass. 1545. *microcarpon*, Muhl.
Gray's Manual.
Panic-Grass. 1546. *pauciflorum*, Ell.
Hubbardston (!). Along the R. R. between St. Johns and Muir (!).
Panic-Grass. 1547. *dichotomum*, L. Th.
Dry or low grounds. A very common and exceedingly variable grass. Some forms seem distinct enough to be considered species.
Panic-Grass. 1548. *depauperatum*, Muhl. Th.
Dry woods and barrens. Common.
Barnyard-Grass. 1549. *Crus-galli*, L.
Low grounds. Variable. Common.
1550. *Crus-galli*, L., var. *hispidum*, Gray.
In swamps, where it seems indigenous. Common.

SETARIA

1551. *verticillata*, Beauv.
Lansing, College grounds.
Foxtail. 1552. *glauca*, Beauv.
Fields and gardens. Common.
Pigeon-Grass. 1553. *viridis*, Beauv.
Bottle-Grass. Cultivated grounds. Common.

- Millet.
Bengal-Grass. 1554. *Italica*, Kunth.
Remaining after cultivation.

Adv.

CENCHRUS

- Bur-Grass. 1555. *tribuloides*, L.

This bad weed has begun to occupy the S. part of the State, not having been reported N. of Grand Rapids (!). Not as yet troublesome in fields, but likely to become so on sandy farms along the Great Lakes.

ANDROPOGON

- Beard-Grass. 1556. *furcatus*, Muhl.
Light soil.

C. & S.
Common.

- Beard-Grass. 1557. *scoparius*, Mx.
Sterile soil.

C. & S.
Frequent.

- Beard-Grass. 1558. *Virginicus*, L.
S. Mich.—Wright Cat.

SORGHUM

- Indian-Grass. 1559. *nutans*, Gray.
Wood-Grass. Dry banks and sandy fields. Variable.

C. & S.
Common.

EQUISETACEÆ.

(*Horsetail Family.*)

EQUISETUM

- Great Horse-tail. 1560. *Telmateia*, Ehrh.
Shore of the upper Great Lakes.—Gray's Manual.
- Common Horsetail. 1561. *arvense*, L. (***)
Damp, sandy grounds.
- Meadow Horsetail. 1562. *pratense*, Ehrh.
Macomb Co.; Flint; to Pine Lake, Emmet Co.—Winch. Cat.
- Wood Horse-tail. 1563. *sylvaticum*, L.
Ann Arbor, rare.—Allmend. Cat.; Clinton Co. (!); Montcalm Co. (!); Flint; and northward where it is common.
- Swamp Horsetail. 1564. *palustre*, L.
1565. *limosum*, L.
In shallow water.
- Scouring Rush. 1566. *hyemale*, L. (***)
Wet banks.
1567. *variegatum*, Schleicher.
1568. *scirpoides*, Michx.

Th.
Common.
L. P.
Rare.

Th.
U. P.
C. & S.
Common.
Th.
Common.

Th.
S. E.—Winch. Cat.; Hubbardston (!); Muir (!); Macomb Co.; Flint; sand dunes at the head of Little Traverse Bay (!); Drummond's I., etc.
Infr.
Th.

FILICES.

(*Ferns.*)

POLYPODIUM

- Common Polypody. 1569. *vulgare*, L. (***)
Dry banks and rocks. Grand Ledge—Prof. W. J. Beal; Hubbardston (!), etc. Rarely seen in L. P., but very common in U. P.

Th.

ADIANTUM

- American Maiden-hair. 1570. *pedatum*, L. Th.
Rich, moist woods. One of our most beautiful ferns. Common.

PTERIS

- Bracken or Eagle-Fern. 1571. *aquilina*, L. (***) Th.
Thickets. Common.

PELLÆA

- Slender Cliff-Brake. 1572. *gracilis*, Hook.
Louise Is.—Winch. Cat.
- Clayton's Cliff-Brake. 1573. *atropurpurea*, Link.
Shaded limestone rocks. N. E.—Winch Cat.; Put-in-Bay (!)

CRYPTOGRAMME

- American Rock-Brake. 1574. *acrostichoides*, R. Br. U. P.
Isle Royale.—Gray's Manual.

WOODWARDIA

- Virginia Chain-Fern. 1575. *Virginica*, Smith. Th.
Marshes. Marquette Co.—Burt MS. Cat.; Westville, Montcalm Co. (!); Macomb Co.; Flint; Lansing & So. Haven—Bailey; Hubbardston (!); Ann Arbor—Allmend. Cat.
- Netted Chain-Fern. 1576. *angustifolia*, Smith.
The only known locality of this fern in Michigan is at South Haven, where it was detected in 1880 by L. H. Bailey, Jr.

ASPLENIUM

- Maiden-hair Spleenwort. 1577. *Trichomanes*, L. N.
N. E.—Winch. Cat.
- Ebony Spleenwort. 1578. *ebeneum*, Ait.
Allegan (!)—Miss Josie A. Williams.
- Wall-Rue. 1579. *Ruta-muraria*, L.
N. E.—Winch. Cat.
- Narrow-leaved Spleenwort. 1580. *angustifolium*, Michx. C. & S.
Rich woods. S. W.—Wright Cat.; Ann Arbor, rare—Allmendinger Cat.; Flint; S. Haven and Lansing—Bailey; Ionia Co. (!). Infrequent.
- Silvery Spleenwort. 1581. *thelypteroides*, Michx. (***) C. & S.
Rich woods.
- Lady-Fern. 1582. *Filix-fœmina*, Bernh. (***) Th.
Moist woods. Exceedingly variable. Common.
- Lady-Fern. 1583. *Filix-fœmina*, Bernh., var. *exile*, Eaton.
Hubbardston (!).

CAMPTOSORUS

- Walking-Leaf. 1584. *rhizophyllus*, Link. (?)
Occurs in N. Ohio, and may be looked for S.

PHEGOPTERIS

- Common Beech-Fern. 1585. *polypodioides*, Fée. U. P.
Isle Royale—Dr. A. B. Lyons.
- Hexagon Beech-Fern. 1586. *hexagonoptera*, Fée. C. & S.
Beech woods. Flint; Hubbardston (!); Ann Arbor—Allmendinger Cat. Rare.
- Oak-Fern. 1587. *Dryopteris*, Fée. Th.
Open woods. Frequent n. of lat. 43°, especially under pines.

ASPIDIUM

- Marsh Shield-Fern. 1588. *Thelypteris*, Swartz. Th.
Swamps. Frequent.
- New York Shield-Fern. 1589. *Noveboracense*, Swartz. C. & S.
Swamps. Ann Arbor—Allmendinger Cat.; Macomb Co.; Lansing—Bailey; Hubbardston (!).
- Fragrant Wood-Fern. 1590. *fragrans*, Swartz. U. P.
Crevices of shaded cliffs. Isle Royale, and Keweenaw Peninsula.—Dr. Lyons.
- Spinulose or Common Wood-Fern. 1591. *spinulosum*, Swartz, var. *vulgare*, Eaton. Th.
Shady woods. Flint; Hubbardston (!); L. Superior—D. C. Eaton, Ferns of N. A.
- Spinulose or Common Wood-Fern. 1592. *spinulosum*, Swartz, var. *intermedium*, Eaton. Th.
Woods. Common.
- Spinulose or Common Wood-Fern. 1593. *spinulosum*, Swartz, var. *dilatatum*, Eaton. Th.
Woods. Ann Arbor—Allmendinger Cat.; Macomb Co.; Flint; Hubbardston (!); Petoskey (!); and northward.
- Boott's Wood-Fern. 1594. *Boottii*, Tuckerman.
Alder thickets. Hubbardston (!); Ann Arbor—Winch. Cat.
- Crested Wood Fern. 1595. *cristatum*, Swartz. Th.
Swamps. Frequent.
1596. *cristatum*, Swartz, var. *Clintonianum*, Eaton.
Ann Arbor.—Allmendinger Cat; Hubbardston (!).
- Goldie's Wood-Fern. 1597. *Goldianum*, Hook. C. & S.
Moist woods. Lansing.—Bailey; Flint; Hubbardston (!). Rare.
- Male-Fern. 1598. *Filix-mas*, Swartz. (*) U. P.
Rocky woods. Keweenaw Peninsula, Lake Superior.—Gray.
- Evergreen Wood-Fern. 1599. *marginale*, Swartz. (***) Th.
Hillsides in rich woods. S. Haven—Bailey; Flint; Hubbardston (!); and northward. Frequent.
- Christmas-Fern. 1600. *acrostichoides*, Swartz. Th.
Shady hillsides. Fronds evergreen, used for decoration. Common.
- Holly-Fern. 1601. *Lonchitis*, Swartz. U. P.
Woods. Southern shore of L. Superior.—Prof. Whitney.
- Prickly Shield-Fern. 1602. *aculeatum*, Swartz., var. *Braunii*, Koch. U. P.
Ontonagon Peninsula.—Eaton's Ferns of N. A.

CYSTOPTERIS

- Bulblet Cystopteris. 1603. *bulbifera*, Bernh. Th.
Moist shaded hillsides. Locally frequent.
- Brittle-Fern. 1604. *fragilis*, Bernh. Th.
Woods and river banks. Ann Arbor—Allmendinger Cat.; Lansing—Bailey; Flint; Hubbardston (!) northward to L. Superior—Whitney.
- Mountain Cystopteris. 1605. *montana*, Bernh.
North shore of Lake Superior, J. Macoun, 1869,—Eaton's Ferns of N. A.; and probably in our district.

ONOCLEA

- Ostrich-Fern. 1606. *struthiopteris*, Hoff. Th.
Alluvial soil. Worthy of cultivation; one of our finest ferns. Infrequent.
- Sensitive-Fern. 1607. *sensibilis*, L. Th.
Wet places. Abundant.

WOODSIA

- Obtuse-leaved Woodsia. 1608. *obtusa*, Torr. U. P.
Rocky places. Not rare.

Rusty Woodsia.	1609. <i>Ilvensis</i> , R. Br.	N. & U. P.
	N. E.—Winch. Cat.; L. Superior—Whitney Cat.	
Smooth Woodsia.	1610. <i>glabella</i> , R. Br. ?	
	North Shore of Lake Superior—J. Macoun.	
Northern Woodsia.	1611. <i>hyperborea</i> , R. Br. ?	
	North shore of Lake Superior—J. Macoun. The last two species may be looked for in our district.	
Oregon Woodsia.	1612. <i>Oregana</i> , D. C. Eaton.	U. P.
	Crevice of rocks south shore of Lake Superior—Gray's Manual.	

DICKSONIA

Hairy Dicksonia.	1613. <i>pilioscula</i> , Willd.	N.
	Petoskey, Emmet Co.,—Winch. Cat.	

OSMUNDA

Royal-Fern.	1614. <i>regalis</i> , L. (***)	Th.
	Swamps.	Common.
Clayton's Flowering-Fern.	1615. <i>Claytoniana</i> , L.	Th.
	Moist grounds.	Common.
Cinnamon-Fern.	1616. <i>cinnamomea</i> , L.	
	Swamps.	Common.

BOTRYCHIUM

Moonwort.	1617. <i>Lunaria</i> , Swartz.	U. P.
	"Lake Superior (Lesquereux), and sparingly northward."—Eaton in Gray's Manual.	
Hitchcock's Moonwort.	1618. <i>simplex</i> , Hitchcock.	U. P.
	Hillsides. Westward to Lake Superior.—D. C. Eaton, Ferns of N. Am.	
Lanceolate Grape-Fern.	1619. <i>lanceolatum</i> , Angström.	U. P.
	Damp mossy places. Lake Superior—H. Gillman.	
Matricary Grape-Fern.	1620. <i>matricariæfolium</i> , Al. Braun.	U. P.
	Dark wet woods. Lake Superior.—D. C. Eaton.	
Virginia Grape-Fern.	1621. <i>Virginicum</i> , Swartz.	Th.
	Rich woods.	Common.
	1622. <i>ternatum</i> , Swartz, var. <i>lunaroides</i> , Eaton.	
	J. Macoun.	
Ternate Grape-Fern.	1623. <i>ternatum</i> , Swartz, var. <i>obliquum</i> , Eaton.	
	Pastures and meadows. Fort Gratiot and S. Mich.—Winch. Cat.; Flint; S. Haven,—Bailey; Lansing (!); Ann Arbor,—Allmendinger Cat.; Gratiot Co. (!).	Infrequent.
Dissected G. F.	1624. <i>ternatum</i> , Swartz, var. <i>dissectum</i> , Eaton.	
	South Haven (!)—Bailey.	

LYCOPODIACEÆ.

(Club-moss Family.)

LYCOPODIUM

Club-moss.	1625. <i>lucidulum</i> , Mx.	Th.
	Moist woods.	Frequent.
Club-moss.	1626. <i>Selago</i> , L.	
	Lake Superior—Gray's Manual.	
Club-moss.	1627. <i>inundatum</i> , L.	Th.
	Drummond's I., Willow River, Huron Co., Sugar Is.—Winch Cat.	

Club-moss.	1628. <i>annotinum</i> , L.	N. & U. P.
	Woods. Petoskey (!) to L. Superior.	Common.
Tree-like C. Ground-Pine.	1629. <i>dendroideum</i> , Michx.	Th.
	Moist woods.	Common.
Common Club-moss.	1630. <i>clavatum</i> , L. (***)	Th.
	Dry woods.	Common.
	1631. <i>complanatum</i> , L.	Th.
	Bangor, Van Buren Co.—Bailey; Woodard Lake, Ionia Co.(!); Flint; Macomb Co.; Stanton(!); and northward.	
SELAGINELLA		
Selaginella.	1632. <i>selaginoides</i> , Link.	U. P.
	Isle Royale—Dr. A. B. Lyons.	
Selaginella.	1633. <i>rupestris</i> , Spring.	Th.
	Flint; Woodard Lake(!); rare in L. P., but common in U. P.	
Selaginella.	1634. <i>apus</i> , Spring.	
	Ann Arbor—Allmendinger Cat.; Hubbardston(!)	Infrequent.

ERRATA.

- Page 429, line 22. For "three-fourths" read *two-thirds*.
Page 430, line 22. For "eltaum" read *elatum*.
Page 430, line 24. For "Sheperdia" read *Shepherdia*.
Page 431, line 13 from the bottom. For "Potamageton" read *Potamogeton*.
Page 434, note under No. 16. For "full—double" read *full-double*.
Page 436, under No. 43, after "Flint, etc.," read *Commonly cultivated for hedges, and rarely adventive*.
Page 436, note under No. 44. For "Common" read *Common*.
Page 438. No. 78 is an introduced plant.
Page 442, No. 150, com. name. For "Long-eared" read *Long-leaved*.
Page 442, No. 160. Read "Adv. and rare," after "Dr. Wright, Dr. Clark."
Page 443, No. 171, com. name. Insert a period after "Indian Mallow."
Page 443. No. 172 is indigenous.
Page 443, No. 174, com. name. Insert a period after "Basswood."
Page 444. No. 182 is adventive from Europe.
Page 443, note under No. 195. For "inoculous" read *innocuous*.
Page 445, No. 196. For "radican" read *radicans*.
Page 450, No. 273. For "Leucantha" read *leucantha*.
Page 453, note under No. 318. For "Kittattiny" read *Kittatinny*.
Page 453, note under No. 330. For "Crategus" read *Cratægus*.
Page 460, note under No. 431. For "flower" read *fruit*.
Page 464. Read "BARRENS" as part of note under No. 502—*Bowens*. S. Mich., etc.
Page 466, No. 541. For "var. L." read *L., var.*
Page 480, No. 792, com. name. For "Frog-Fruit" read *Fog-fruit*.
Page 488, No. 911. For "S." read *C. & S.*
Page 489, No. 929. For "lapithifolium" read *lapathifolium*.
Page 498, note under No. 1057. For "cental" read *central*.
Page 503, note under No. 1130. Substitute a period for the comma after "pine region."
Page 494, No. 1010. For "vulgoris," read *vulgaris Lam.*
Page 511, No. 1261. For "Shultes," read *Schultes*.
Page 512, note under No. 1284. For "Baily" read *Bailey*.
Page 513, No. 1309. For "teretinscula," read *teretiuscula, Good.*
Page 516, No. 1389. For "Scabrata," read *scabrata*.
Page 518, No. 1440. For "Low Grounds," read *Low ground*.
Page 520, note under No. 1466. Substitute a period for the comma after "River banks."

ANNUAL STATEMENT OF LIBRARIAN.

To the Executive Board of the Michigan State Horticultural Society:

GENTLEMEN,—I herewith submit to you my report as Librarian of the State Horticultural Society, to which office I was appointed by the executive board, on March 31, 1880. Up to the present time there has been received and distributed by me the following number of copies of our State Pomological Reports:

	1871	1872	1873	1874	1875	1876	1877	1878	1879
Received.....	13	88	34	26	151	845	789	595	5747
Distributed	7	6	7	5	13	68	53	64	4076
On hand	6	82	27	21	138	777	736	531	1671

There have been donated to the library and received through exchanges 193 books.

The following list comprises the books, with the number of copies and years issued, now in the library:

HORTICULTURAL AND POMOLOGICAL REPORTS.

American Pomological Society, 1873, '77.
 Georgia (Horticultural)—1877.
 Illinois (Horticultural)—1868, '69, '70, '71, '72, '73, '74, '75, '76, '77, '78 '79.
 Indiana (Horticultural)—1871, '72, '73, '74, '75, '76, '77, '78, two copies; '79.
 Iowa (Horticultural)—1871, '72, '73, '74, '75, two copies of each; '76, '77, '78.
 Kansas (Horticultural)—1874, '75, '76, '77, '78.
 Maine (Pomological)—1873-4, '74, '75, '76-7, '77.
 Massachusetts (Horticultural)—1874, Part II.; 1877, Part I., three copies; Part II.
 Michigan (Pomological)—1871, '72, '73, '74, '75, '76, '77, '78, '79.
 Minnesota (Horticultural)—1866 to 1873, three copies of each; '74, two copies; '75, three copies; '76, four copies; '77, '78, two copies of each.
 New Jersey (Horticultural)—1876, '77, '78, two copies of each; '79.
 New York (Western Horticultural)—1876, '77, two copies; '78, three copies.
 Ohio (Montgomery Co. Horticultural)—1877, four copies; '78, three copies.
 Pennsylvania Fruitgrowers' Association—1867 to '70, '71, '72, '73-4, '75, '76, '77, two copies; '79.
 Wisconsin (Horticultural)—1870 to 1874, '75, '76, '77, '78, '78-9.
 Province of Ontario Fruitgrowers—1874, '75, '76, '77, '78, '79, three copies.
 Montreal (Horticultural)—1877.
 The American Fruit Culturist, by Thomas.
 Culture and Treatment of the Grape Vine, by Allen.
 Downing's Encyclopedia of Fruits and Fruit Trees of America, two Vols.

AGRICULTURAL REPORTS.

- Department of Agriculture (United States)—1862, '63, '64, '65, two copies; '66, '67, '68, two copies; '69, '70, '71, '72, '73, three copies; '74, '75, '76.
 Connecticut—1866, '67, '68, '71, '72, '73, '74, '75, '76, '77, '78, '79.
 Indiana—1870, '71, '72, '73, '74, '75, '77, '78.
 Iowa—1875.
 Illinois—1859-60, '69-70, '71, '72, '73, '74, '75, '76, '77, two copies; '78, '79.
 Kansas—1873, '74, '76, '77-8.
 Maine—1858, '67, '68, '70, '71, '73, '74, '74-5, '75, '75-6, '76-7, '77-8, two copies.
 Massachusetts—1876-7, '77-8, '78-9, two copies; '79-80.
 Michigan—1850, '51, '53, '54, '56, '58, '59, '65, two copies; '66, '67, '68, '69, '70, '71 two copies of each; '72, '73-4, '75, '76, '77, '78, one hundred copies; '79.
 Missouri—1868 '70, two copies; '72, '74, '75, '76, two copies; '78, three copies.
 New Jersey—1879.
 New York—1853, '56, '57, '59, '61.
 Ohio—1856, '59, '61, '62, '63, '66, '67, '68, '69, '70, '71, '72, '73, '74, '75, '76, '77.
 Pennsylvania—Vol. 1, 4, 5, 6, 8, 10, 11, 12.
 Vermont—1875-6, '77, '78.
 Wisconsin—1851, '52, '58-9, '61 to '68, '69, '70, '71, '72-3, '73-4, '74-5, '75-6, '76-7, '77-8, '78-9.
 Transactions American Institute, 1846, '47, '49, two copies; '50, '57, '58, three copies; '59, two copies; '61.
 Year Book of Agriculture, 1855-6.
 Text Book of Agriculture.
 Patent Office Reports (Agriculture), 1853, '55, '60.
 Iowa Agricultural College, '76-7, two copies.
 Louisiana Agricultural College, '77-8.
 Ontario School of Agriculture, 1879.

MISCELLANEOUS.

- Illinois Industrial University, 1868, '69, '70-1, '71-2, '72-3, '73-4.
 Smithsonian Reports, 1863, '64, '66, '67, '68, '69, '70, '77.
 Reports Supt. Public Instruction (Michigan), 1852, ('55, '56, '57), '58, '59, '60, '61, '62, '63, '64, '65, '66, '67, '68, '79, '70, '71, '72, '73, '74, '75, '76, '77, '78, '79.
 Thirty-second Annual Report of the Board of Education (Massachusetts).
 Report of the Acting Commissioner of Indian Affairs, 1867.
 Report upon Forestry, 1877.
 Metcalf's Key to Bee-Keeping (Pub. in 1862).
 Charts and Pamphlets on Topography, Climate, and Geology of Michigan, by Alex Winchell.

Respectfully submitted,

FRANK W. KING,
Librarian.

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Rowe, William, Grand Rapids, Kent county.
Rowe, William N., Grand Rapids, Kent county.
Root, Amos, Jackson, Jackson county.
Rose, Mrs. Sophie E., East Saginaw, Saginaw county.
Russell, Dr., Geo. B., Detroit, Wayne county.
Slayton, Asa W., Grattau, Kent county.
Scott, J. Austin, Ann Arbor, Washtenaw county.
Scott, E. H., Ann Arbor, Washtenaw county.
Staunton, G. W., Grand Rapids, Kent county.
Savidge, Hunter, deceased, Spring Lake, Ottawa county.
Shoop, Rev. D. R., Hastings, Barry county.
Sleeper, F. S., Galesburg, Kalamazoo county.
Soule, J. B., Fruitport, Muskegon county.
Sterling, F. S., Monroe, Monroe county.
Sterling, J. M., Monroe, Monroe county.
Sterling, J. C., Monroe, Monroe county.
Sterling, W. C., Monroe, Monroe county.
Sterling, W. P., Monroe, Monroe county.
Sterling, Mrs. Emma M., Monroe, Monroe county.
Shirts, E. J., Shelby, Oceana county.
Suttle, John (deceased), Grand Rapids, Kent county.
Smith, E. T., Ionia, Ionia county.
Smith, N. E., Ionia, Ionia county.
Steere, B. W., Adrian, Lenawee county.
Stearns, J. N., Kalamazoo, Kalamazoo county.
Sessions, Alonzo, Ionia, Ionia county.
Sessions, William, Ionia, Ionia county.
Sigler, Artemus, Adrian, Lenawee county.
Sinclair, W. G., Spring Lake, Ottawa county.
Smith, H. H., Jackson, Jackson county.
Tracy, Will W., Detroit, Wayne county.
Thompson, W. D., Jackson, Jackson county.
Thompson, J. P., deceased, Detroit, Wayne county.
Taylor, George, Kalamazoo, Kalamazoo county.
Taylor, George C., Kalamazoo, Kalamazoo county.
Towles, George W., Benton Harbor, Berrien county.
Vick, James, Rochester, New York.
Waite, Gilbert M., Paw Paw, Van Buren county.
Walker, S. S., St. Johns, Clinton county.
Watkins, J. D., Manchester, Washtenaw county.
Wells, H. G., Kalamazoo, Kalamazoo county.
Williams, S. P., Monroe, Monroe county.
Wier, Antoine, Monroe, Monroe county.
Webber, George W., Ionia, Ionia county.
Webber, Miss Francis E., East Saginaw, Saginaw county.
Wooding, Charles F., Lowell, Kent county.
Woodward, David, Clinton, Lenawee county.
Winchester, A. O., St. Joseph, Berrien county.
Wurtz, Elias H., East Saginaw, Saginaw county.
Whittlesey, John, St. Joseph, Berrien county.
Zeigler, J. C., Saginaw City, Saginaw county.

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